REPORT OF MEETING

COOPERATIVE INTERREGIONAL COTTON RESEARCH NETWORK

SEVILLA - MARCH 4, 1991

Michel BRAUD

IRCT Director

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1. Ojectives :

Objectives of this meeting were following :

- to reunite the four subnetworks liason officers in order
  - * to dress a balance of their activity since the creation of the network
  - * to evaluate found difficulties
  - * to take them in consideration for next future

2. How the meeting passed off

The meeting took place in the meeting hall of the "Las Torres" center. The hall was put to our disposal by "Direccion General de Investigacion y Extension Agrarias" of "Junta de Andalucia" and we thank them for it.

Were present :

Egypt :

Dr. Ali Ahmad Al-Ashwat
Cotton Research Institute
Giza
"Liaison Officer of Sub-Network Technology"

Spain :

Dr. Adolfo Borrero Fernandez
Chairman of Working Group Variety Trials
Organizator of the meeting

Dr. Juan Carlos Gutierez Mas

Dr. D. Dario Rodriguez Garcia

CIDA - Las Torres
Alcala del Rio

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We note the absence of Dr. Elias Fereres, the Liaison Officer of Sub-Network Agronomy and Physiology of Cotton. He hasn't given previously any reason for not coming and his absence is very regretable because it concerns the group the most important by the number of the working groups.

France :

Dr. Michel Braud
IRCT Director
Network Coordinator

Greece :

Dr. S. Galanopoulou
Liaison Officer of Sub-Network Cotton Breeding

D. Batzios
Chairman of working group Breeding for Earliness

Dr. D. Kyriakou
Chairman of working group Breeding for Pest and Disease Resistance

Cotton and Industrial Plants Institute
Sindos - Thessaloniki

Maroc :

Dr. L. El Jadd
INRA - Station of Cotton Research - Director
Liaison Officer of Sub-Network Cotton Pest and Disease Control
Beni-Mellal

Michel BRAUD disolves the meeting at 10 o'clock welcoming the present researchers and reannouncing meeting's agenda prepared in agreement with Dr. BORRERO. It corresponds to the above objectives.

Than he leaves the call to Dr. GALANOPOULOU to start up with Sub-Network Cotton Breeding problems. He wishes to see the exhibit of the three corresponding working groups.

The presentations of Mr. D. BATZIOS and Dr. D. KYRIAKOU are enclosed in annexe 2 and 3.

After having exposed met difficulties, mainly attached to communication problems, Dr. BORRERO suggests a discussion of his project of the protocole of varietal trial, in order to come to agreement of present members. (annexe 6)

We take a break only to visit the technology laboratory with H.V.I. Spinlab turned on.

Dr. GALANOPOULOU presents than the condition of variety improvement in Greece (annexe 1)

Dr. L. EL JADD informs us of his efforts to animate his Sub-Network and difficulties due to communication problems between not enough inspired researchers. (annexe 4 and 5)

Dr. AL ASHWAT's account, with a very interesting content, shows how far the reality stands from our dreams. Once again, for the same reasons as told by all participants.

At the end of technical exhibits, M. BRAUD brings up the question as for next complete meeting. Dr. GALANOPOULOU confirmes the candidature of Greece which soon should be announced officialy. The delay is due to Greek Cotton Research structure changes. Held is the period from September 7 to 9, 1992.

M. BRAUD thanks warmly all participants for their intervention and our Spanish collegues for the quality of their welcome, and closes the meeting up at 7 p.m.

3. Reflection on the content of the exhibits and on the function of the network.

The reflections to follow might look embittered, yet they would like to be constructive and have for objective : a good function of the network.

In resume the exhibits give following impression :

- as for themselves they are absolutaly interesting, yet they are only relations of national experiences, as a matter of fact limited to Greece

- absence of communication between researchers not motivated by a network work

Morality : this network doesn't work ;
this network doesn't live

What to do ?

3.1 - To be conscient of the added scientific value of the work in network

To improve this idea, we start up with the example of our discussions concerning the elaboration of the protocol of varietal trial.

The first halt, indispensable : to define the objective of forseen work.

Under the circumstances two conceptions are to be thought of :

- to propose a common varietal trial using each country's variety, with a standard dispositive. Taking for a hypothese that the work of creation and varietal improvement of each country is well done, it is most probable that the best variety or the best varieties of each trial will be the national one. Where is the interest of such a trial done in the limit of a network. One understands hesitations or even a refusal of solicited researchers. It's just a supplementary test without any particular interest.

- we start up from the fact that there is a great variability of ecologic conditions and cultural technics in the network limit.

The stake consists in passing from a research simply descriptive to a causal research. In other words in trying to analyse the elements of outturn of one cotton plant variety in terms of the production factors, ecologic or cultural. Doing this, we gain more scientific knowledge of a cotton plant which can be used in interior of national programmes to improve their own efficiency. Each researcher contributes personnaly in this commun work, of which he himself can profit. That's how the network is justified, its link with a national programme, and there comes a hope of adhesion of an intelligent researcher.

The second conception is obviously the one we've defended in Sevilla. It should be able to apply on the whole of working groups, with some necessary adaptions each time.

3.2 - Necessity to engage the responsability of participating national institutions

At the issue of the network constitutive meeting, every country that was decided for lodging a center of liaison or a working group, confirmed its candidature and designed one person in charge.

Outside a few exceptions, that was all, judging by the communication absence of which all the members of our meeting have informed us. This situation isn't normal and that is why (mainly) the network doesn't work.

We all know that we are very busy. But if a designed researcher knows he can't assume what is confined to him, he should be honest enough to let it know and ask to be substituded. Than it is a national coordinator's job to choose his replacement. Should such a solution not be possible, he should advice rapidly the liaison officer who lets it know to other countries.

Not proceeding this way means : block out, silence and inefficency.

3.3 - To have the abilities of our action

The preocupations of network researchers, analysed upon our direct contacts, are short-dated, with for central objective reduction of the production cost, the precise and firm demande of cotton

producers. The national possibilities of which they dispose are established in aim of that objective. It is clear that the mid-long and long-dated objectives should be put on the network disposition. The exemple of varietal trial with for objective a causal research, supposes supplementary observation means, not indespensable in the first case of figures. Financed by who ? That is the first question and its answer brings up more questions.

The function of such a network, meetings, secretariat, visits ... isn't for free. It has to be recognized that outside a few participations in Sevilla meeting, financed by FAO, IRCT has been the only one to bear the rest, although it doesn't get any direct benefit out of it. That situation isn't satisfactory and can not last. What solution to adapt for such a support ?

The coordination of such network, which supposes visits in different research centers concerned (= time, money) needs a real avaibility. Is that avaibility compatible with another (others) activity ? My own experience is rather negative. Who than ? A full time top level researcher ? Who is to pay ? And there go new questions !

For the rest of the time left for the coordination of the network, and for our succesors, we await answers and suggestions.

3.4 - Conclusion

To keep the network alive, our conclusion are resumed as follow :

- to get together researchers personnaly convinced of the interest in network work as a way of improving the quality of their research

- to convince the national institutions to support them officialy

- to find financial means to support the additional costs of common programmes, generaly mid-long and long-dated

- for the mid-long dated programme to find an enough available coordinator to dedicate a large part of his time to the network function

At last an implicit condition : let not the economical part to be the only interest of each partner ! Am I dreaming ?

Distribution :

Mr. Deat
Ms. Setatou
Dr. Galanopoulou
Dr. Fereres
Dr. El Jadd
Dr. Al-Ashwat
Mr. Batzios
Dr. Kyriakou
Dr. Borrero
Dr. Olez
Dr. Simonis
Dr. Kosmidou
Prof. El-Fouly
Dr. Elgindy
Dr. Melero
Dr. Louwagie
Dr. Kechagia
Dr. Berengena

ANNEXE 1.- Cotton Breeding in Grèce, Dr. S. GALANOPOULOU, Liaison Officer of the Sub-Network "Cotton Breeding"

COTTON BREEDIND IN GREECE

by Stella Galanopoulou

Prepared for the FAO Cotton Network/ICAC
meeting in Seville 4-5 March 1991

Creation of varieties in Greece:

The breeding of Cotton varieties in Greece began with the foundation of the Cotton Research Institute at Sindos-Thessaloniki in 1931. Several cotton varieties have been bred ever since, with increased cotton yield and improved quality with a resulting increase in the total production.

Greece is a marginal country of cotton belt and therefore foreign varieties are not usually adapted under greek ecological conditions. This is the main reason for the fact that mainly greek varieties were cultivated in Greece so far.

The generally used breeding method is the Pedegree method adapted to meet the local cotton growig problems in our Country.

Cotton varieties nowadays must combine high productivity, with general adaptability to environmental conditions, earliness and good resistance to Verticillium wilt. They must also be suitable for mechanical harvesting and with desirable technological characters.

To create a new variety with the above described characters, starting matterial is carefully selected. This material may be obtained either from old selections and foreign varieties, or from crosses between varieties with interesting characters. From this material, spaced plants are cultivated in a breeding field, where selections are carried out and plants are isolated with these characters.

Selections are made in two periods. First at the begining of plant flowering a rather large number of plants is selected, in which, self pollination is taking place by tieing flower-buds. In Autumn the selected plants are subjected to a second selection during which a number of plants is eliminated.

The finally selected plants from the breeding field are harvested seperately and their raw-cotton characters are determined in the Laboratory. Plants with no satisfactory lint characters are further excluded. Previous pedigree data is also compared with last year's data.

The seed of each finally selected plant is used the next year in the breeding field, to sow a plot for a new selection cycle. The above procedure is repeated for several years until lines having stability in most of the desirable characters are obtained. In the breeding field spaced plants are cultivated and therefore

competition is absent during the selection procedure. To evaluate lines under comppetiting conditions seed of the non selected plants form each line is used to lay out a microtest in which the performance of the lines is examined. The most promising lines according to their performance in the microtests are mixed to form the seed of the new variety. There after the new variety is compared with other varieties, in typical cotton varietal experiments that are established every year in the main cotton growing areas of the country in collaboration with the Services of the Ministry of Agriculture and the Greek Cotton Board.

From the results of these experiments a full idea of the agricultural value of the varieties tested is obtained. Finally before introducing a variety in general cultivation a further large scale test in different regions is made while at the same time seed production is in progress. After the entrance of Greece to the European Common market only varieties written in the National list can be seed propagated and cultivated in the country. If a variety is written only at the Common. list it can be cultivated in Greece but not seed propagated.

Cultivated varieties in Greece:

During 1990 the following varieties were cultivated in Greece.

Varieties	% of total area (≈ 300 th.ha)
4S	12.1
Sindos 80	24.0
Zeta 2	39.7
Zeta 5	7.6
Acala Sindos	0.9
Samos	5.2
Acala SJ-2 (origin:USA, ISRAEL)	10.5

New greek varieties:

In 1990 three new greek varieties entered the National list under the names: Eva, Corina and Myrto. The two first of them look very promising according to the results of the extensive experimentation carried out the last six years. They are considered as significant achievements of our recent breeding programme.

The variety Eva (a cross product between the greek variety EXD and an american Delcot variety) proved to be 9% higher yielder than the cultivated greek variety Sindos 80, less susceptible to Verticillium wilt and with the same earlines and high technological characters of Sindos 80.

The variety Corina (a cross product between the greek 4S153 and the Russian variety Taskend 3) gave higher lint yield in comparison to 4S and Zeta 2, 30 and 25% respectively, showed the same earliness with middle early 4S and significant earliness in comparison to the late Zeta 2, her technological characters seem

at least equal to 4S which is distinquished for quality and was proved also significantly more tolerant to Verticillium than 4S even a bit more tolerant than the tolerant Zeta 2 (See results for the 2 varieties on the attached table).

Earliness and Verticillium wilt resistance:

The creation of these two varieties lead to the conclusion that although there is a negative correlation (or linkage) between earliness and resistance to Verticillium there is a possibility to break this undesirable linkage to a considerable degree.

Earliness is a factor of paramount importance for cotton crop throughout the world leading to lower production cost but especially for cotton cultivation in temperate regions because it results in a higher yield, higher picking efficiency and less deterioration of quality in the case of unfavourable conditions during harvesting period. Early harvest permits also the field to be prepared in time for next crop.

On the other hand Verticillium wilt is one of the main diseases of Gossypium hirsutum L. cultivars, the most severe in Greece. It can not be controlled practicaly by chemicals, so a remedy to the problem can be achieved by creation and cultivation of tolerant varieties (as none of G. hirsutum cultivars is immune or high resistant to fungus) in combination with different cultural practices, as crop rotation, high plant density, early shredding of stalks and early plow-down etc. Creation and release of tolerant varieties is not a permanent solution to the problem as the varietal monoculture leads to the break of varietal resistance as is the case at California's San Joaquin Valley. In that region three differentially tolerant cotton varieties were grown in the same rows for five successive years. The rate of buildup of new inoculum as well as the percentage of defoliated plants was greater according to the degree of varietal susceptibility during the first years but the percentage of defoliated plants of the more tolerant cultivars increased in successive years suggesting that a tolerant variety planted year after year in the same infested soil increases the soilborne inoculum of more aggressive strains of Verticillium dahliae. A similar experiment was carried out at Sindos Greece during the period 1984-1987 but there was not indications that the varietal resistance was differentiated after the successive cultivation of the same variety (see results on the attached tables). It must be mentioned that the experimentation in Greece lasted only four years, that the inoculum density was much lower than in the first experiment and that all infested plants were counted (even those with slight symptoms) while in the first experiment only defoliated plants were considered as infested.

An aproach to Verticillium problem at our region can be achieved by:
1) Genetic diversification of cultivars grown, 2) use of moderately Verticillium wilt-tolerant cultivar where medium levels of inoculum exist in the soil, in

combination with short-term rotation with crops that do not contribute new inoculum and 3) use of the most tolerant (available and adapted in the region) cultivar only in the cases with high levels of inoculum.

Cotton hybrids:

During the period 1985-87 five interspecific (G. hirsutum x G. barbadense) and fourteen intra hirsutum hand pollinated greek cotton F_1 hybrids were tested at two locations of Greece. Hirsutum hybrids showed useful yieled heterosis 103-159% in comparison to the best cultivar. Some of them were distinguished for their stability, productivity and their tolerance to Verticillium wilt (in cases where one of the parents was tolerant). Fibre technological characters were in the frame of upland cotton. The interspecific hybrids had the barbadense phenotype, yielded less, showed lower stability and more lateness than hirsutum hybrids, but all of them had the high quality and ligh Verticillium resistance of G. barbadense. This fact gives specific interest to some interspecific hybrids which showed considerable low decrease of yield and lateness (see results on the attached figures). Foreign hybrids tested during the same period as well as previously were proved inferior to greek hybrids indicating that adaptability is a main factor also for cotton hybrids.

The main obstacle for the exploitation of cotton heterosis is the hybrid seed production on a commercial scale. As it is known pollination of male sterile (mother) parent is the most difficult aspect of the problem. Until all the problems be overcome identification of the most promising parent combinations for each region is worthwhile to be tested.

Enforcement of the breeding programmes in the frame of our network:

Breeding of more efficient cotton varieties is of great importance in order the cotton crop to become more competitive and profitable to farmers, especially nowadays with the increased demands of cotton growing and consumption (industry). Creation of varieties with wider adaptability in order to buffer efficiently the ecological fluctuations of temperate regions and with more successful combination of all desirable characters are urgently needed.

Plant selection in segregating generations under different environmental conditions (different locations) proved to be an efficient tool to achieve broad varietal adaptability in many crops as in wheat varieties bred by Norman Borlaug leading to the green revolution and Nobel prize for Peace in 1970.

We present here a scheme of collaboration between our countries in the field of cotton breeding aiming to increace selection accuracy with minimum effort. (See attached draft design). It contains exchange of F_1 seeds between our countries, single plant selection and evaluation at each country but bulking of seed from the best plantsfrom all countries and distribution to all rest countries during F_2 upto F_4 generation and pedigree selection after F_4 generation.

ΠΙΝΑΚΑΣ 1 - TABLE 1

Πειραματικοί αδρομυκώσεως στη Βόρεια Ελλάδα, 1985 - 87

Verticillium wilt trials in North Greece, 1985 - 87

ΠΟΙΚΙΛΙΕΣ	Απόδοση σε σύσπορο % της "Σίνδος 80"			Μέσος όρος 1985 - 1987								Ποσοστό προσβολής % από Verticillium			Μ.Ο.	Μέσος βαθμός προσβολής		
	1985	1986	1987	% Μ Σύσπορο	% Μ Εκκοκ.	Μ.Η.Ω. ± Μ	Βάρος Καρυδιού	Ίνες %	Fibrogr. 2.5%	Micronaire	Pressley	1985	1986	1987		1985	1986	1987
1. Σάμος	96	93	94	94	93	1.7	5.5	40.6	28.2	4.1	7.9	4.3	18.5	13.2	10.9	2.4	2.7	1.9
2. 71046 ('Ακαλα Σίνδου)	96	94	95	95	97	4.5	5.4	42.0	28.0	4.0	8.2	2.5	15.1	9.8	8.2	1.8	2.7	1.9
3. 811314 (EXD x Delcot)	102	105	107	105	109	0.8	5.0	43.0	28.0	3.7	7.9	1.9	11.5	10.4	7.1	2.0	2.7	1.8
4. 811261 (PU x Delcot)	91	107	104	101	102	2.4	5.4	42.0	27.3	3.7	8.0	3.3	10.7	11.1	7.7	2.2	2.7	2.0
5. 821195 (Σίνδος x Delcot)	99	107	103	103	109	1.0	4.7	43.5	27.4	3.6	7.9	2.1	7.7	11.0	6.3	2.0	2.8	1.9
6. Σίνδος 80 (Μ) kg/στρ.	(357)	(318)	(364)	(346)	(143)	20/9	4.7	41.3	28.2	3.7	8.0	7.9	14.3	12.8	11.1	2.1	2.9	1.9
Ε.Σ.Δ. .05	13.3	19.2	12.9	7.2	8.1	1.72	.21	1.23	.49	.31	.19	4.71	10.60	1.49	3.14			
Αριθμός πειρ/κών	(3)	(2)	(2)	(7)	(7)	(6)	(7)	(7)	(7)	(7)	(7)	(3)	(2)	(2)	(7)	(3)	(2)	(1)

ΠΙΝΑΚΑΣ 2 - TABLE 2

Πειραματικοί αδρομυκωσεως στην Κεντρικη και Νότια Ελλάδα, 1985 - 87

Verticillium wilt trials in Central and South Greece, 1985 - 1987

ΠΟΙΚΙΛΙΕΣ	Απόδοση σε σύσπορο % της "4S"			Μέσος όρος 1985 - 1987								Ποσοστό προσβολής % από Verticillium			Μ.Ο.	Μέσος βαθμός προσβολής		
	1985	1986	1987	% Μ Σύσπορο	% Μ Εκκοκ.	Μ.Η.Ω. ± Μ	Βάρος Καρυδιού	Ίνες %	Fibrogr. 2.5%	Micronaire	Pressley	1985	1986	1987		1985	1986	1987
1. Ζέτα 2	97	115	103	105	105	5.4	6.0	39.8	27.7	4.0	8.7	4.5	8.1	6.2	6.5	2.6	2.3	2.3
2. Acala C-1	96	104	104	101	104	5.6	5.9	40.9	27.8	4.0	8.7	6.3	10.4	12.6	9.9	2.5	2.3	2.4
3. GS A74	103	119	110	111	118	2.7	5.0	42.3	27.1	4.2	8.0	2.9	6.7	3.1	4.5	2.2	2.5	2.7
4. Τασκένδη 6	100	120	106	109	110	-1.5	5.5	40.3	27.9	3.8	8.2	4.4	5.3	1.8	4.0	2.3	2.4	2.0
5. 811225 (4SKΠ x Ston 213)	106	102	110	106	110	-0.5	5.0	41.3	26.9	3.8	8.0	6.3	9.5	12.2	9.4	2.8	1.8	2.5
6. 76223 (Στόνβιλ Σίνδου)	116	114	103	111	114	2.7	5.2	40.9	27.6	3.8	8.1	6.3	10.8	16.3	11.1	2.8	2.7	2.8
7. Θάλεια	100	96	103	100	108	5.1	5.2	43.0	28.1	3.7	8.1	4.1	8.9	6.3	6.7	2.2	2.2	2.2
8. 821226 (4S153 x Task. 3)	117	131	111	120	130	0.9	5.3	43.1	27.9	3.9	8.4	4.5	6.5	2.3	4.6	2.4	2.3	2.5
9. 4S (Μ) kg/στρ.	(268)	(274)	(356)	(299)	(122)	15/9	4.8	40.6	27.6	3.6	8.3	11.2	14.3	19.0	14.9	3.0	2.3	2.8
Ε.Σ.Δ. .05	12.4	14.0	13.5	7.7	8.1	1.90	1.98	.67	.32	.15	.16	3.27	5.59	12.66	4.17			
Αριθμός πειρ/κών	(5)	(5)	(4)	(14)	(14)	(12)	(13)	(14)	(14)	(14)	(14)	(3)	(4)	(3)	(10)	(3)	(4)	(3)

ΠΙΝΑΚΑΣ 1 - TABLE 1

Πυκνότητα μολύσματος: Μικροσκληρώτια ανά γραμμάριο εδάφους

Pathogen density: Microsclerotia per gram of soil

Ποικιλία	1984			1985			1986			1987			Μέσος όρος		
	Μ	Δ	Μ.Ο.	Μ	Δ	Μ.Ο.	Μ	Δ	Μ.Ο.	Μ	Δ	Μ.Ο.	Μ	Δ	Μ.Ο.
Α	0.43	1.32	0.88	1.41	1.08	1.25	2.55	3.53	3.04	1.67	4.18	2.93	1.52	2.53	2.02
Β	0.18	3.49	1.84	0.12	0.17	0.15	1.41	3.28	2.35	1.96	7.56	4.76	0.92	3.63	2.27
Γ	2.89	0.11	1.50	0.65	0.56	0.61	1.34	0.20	0.77	3.71	3.11	3.41	2.15	0.99	1.57
Δ	1.71	0.09	0.90	1.41	0.35	0.88	2.52	1.46	2.00	1.97	2.27	2.12	1.90	1.04	1.47
Ε	1.44	0.75	1.10	0.05	0.21	0.13	3.07	1.07	2.07	4.34	2.20	3.27	2.22	1.06	1.64
Ζ	1.02	0.57	0.80	0.22	0.83	0.53	6.09	0.55	3.32	2.36	1.99	2.18	2.42	0.98	1.70
Η	1.89	2.08	1.99	0.24	0.42	0.33	1.01	0.72	0.87	2.38	4.02	3.20	1.38	1.81	1.60
Θ	1.40	0.23	0.82	0.22	0.57	0.40	2.80	1.97	2.39	6.63	2.27	4.45	2.77	1.26	2.02
Ι	2.09	2.75	2.42	0.11	0.19	0.15	5.25	0.54	2.90	2.36	4.92	3.64	2.45	2.10	2.28
Ε.Σ.Δ.05	ns		ns	ns		0.67	ns		ns	ns		ns	ns		ns
Μ.Ο.	1.45	1.27	1.36	0.49	0.49	0.49	2.89	1.48	2.19	3.04	3.61	3.33	1.97	1.71	1.8
Ε.Σ.Δ.05	ns			ns			ns			ns			ns		ns

Μ = Μονές γραμμές Δ = Δίδυμες γραμμές

Ποικιλίες: Α = Σκοτούσα, Β = Acala C-1, Γ = 76223, Δ = 811314, Ε = 71046,
Ζ = Θάλεια, Η = Acala SJ_2, Θ = 811225, Ι = Σίνδος 80

ΠΙΝΑΚΑΣ 2 - TABLE 2

Ποσοστό προσβλημένων φυτών

Percentage of infested plants

ικλία	1984			1985			1986			1987			Μέσος όρος		
	Μ	Δ	Μ.Ο.	Μ	Δ	Μ.Ο.	Μ	Δ	Μ.Ο.	Μ	Δ	Μ.Ο.	Μ	Δ	Μ.Ο.
Α	45.3	32.9	39.1	31.6	19.9	25.8	43.6	31.6	37.6	30.7	14.3	22.5	37.8	24.7	31.3
Β	24.6	15.5	20.1	21.7	10.6	16.2	32.4	26.3	29.4	18.7	11.8	15.3	24.4	16.1	20.3
Γ	47.1	27.5	37.3	23.0	16.4	19.7	51.5	44.0	47.8	35.1	20.4	27.8	39.2	27.1	33.2
Δ	29.4	17.6	23.5	19.7	13.9	16.8	44.3	25.4	34.9	18.6	11.8	15.2	28.0	17.2	22.6
Ε	35.1	19.1	27.1	23.1	15.9	19.5	44.0	30.8	37.4	22.4	18.9	20.7	31.2	21.2	26.2
Ζ	48.7	28.6	38.7	14.0	9.0	11.5	15.8	17.0	16.4	16.4	6.7	11.6	23.7	15.3	19.5
Η	36.7	19.1	27.9	18.1	11.4	14.8	36.1	27.5	31.8	14.4	16.2	15.3	26.3	18.6	22.5
Θ	44.1	22.0	33.1	20.9	15.9	18.4	41.5	29.4	35.5	22.9	13.3	18.1	32.4	20.2	26.3
Ι	50.4	26.4	38.4	31.6	19.6	25.6	53.6	42.0	47.8	35.3	22.1	28.7	42.7	27.5	35.1
.Δ.05	6.31		4.46	ns		3.80	ns		ns	6.96		4.92	5.66		7.02
.Ο.	40.2	23.2	31.7	22.6	14.7	18.7	40.3	30.4	35.4	23.8	15.1	19.5	31.7	20.9	26.3
.Δ.05	8.95			2.79			9.93			3.07			6.51		

Μ = Μονές γραμμές Δ = Δίδυμες γραμμές

Ποικιλίες: Α = Σκοτούσα, Β = Acala C-1, Γ = 76223, Δ = 811314, Ε = 71046,
Ζ = Θάλεια, Η = Acala SJ2, Θ = 811225, Ι = Σίνδος 80

ΠΙΝΑΚΑΣ 3 - TABLE 3

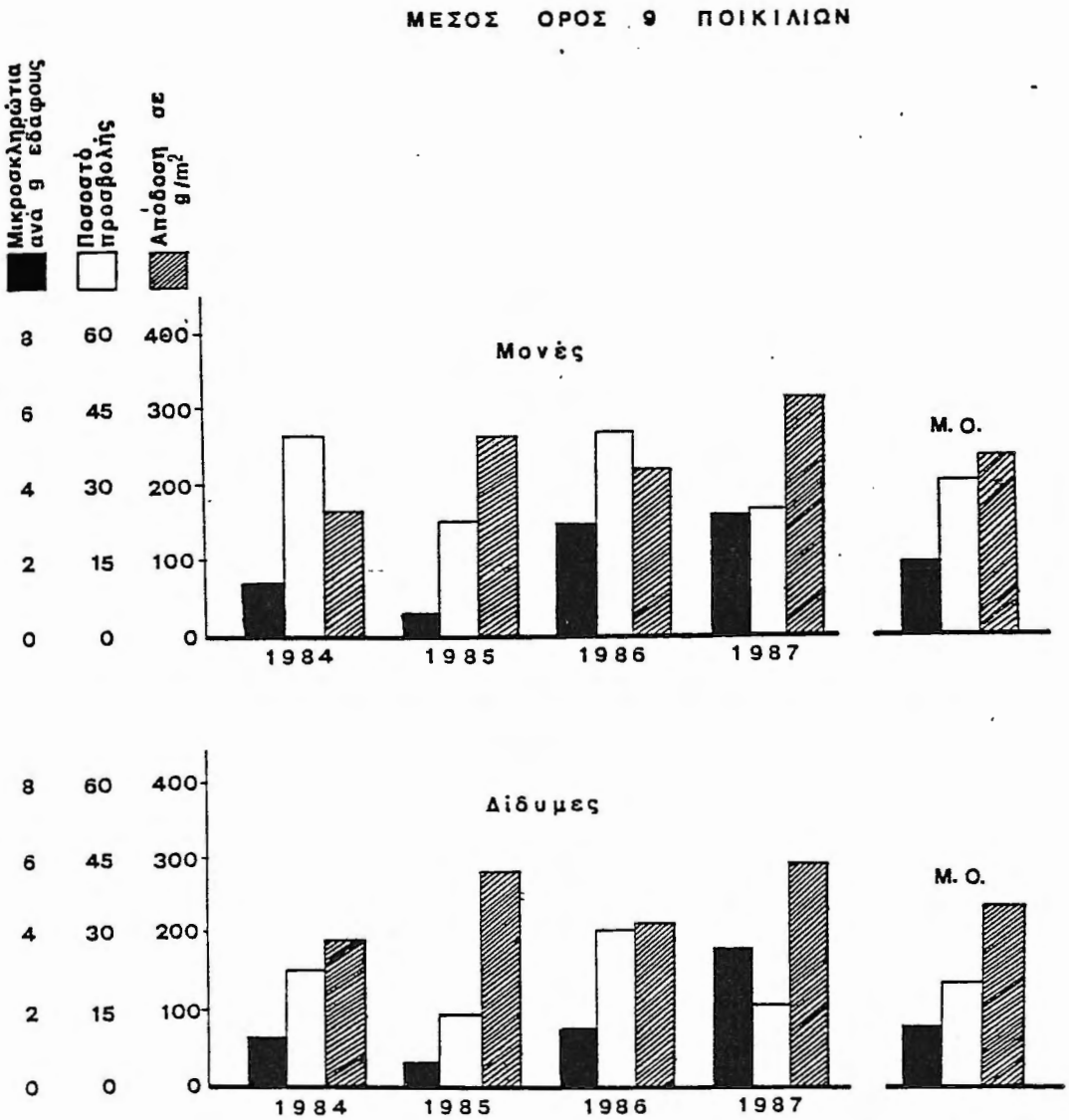
Απόδοση συσπόρου: kg ανά στρέμμα

Seedcotton yield: grams per m²

	1984			1985			1986			1987			Μέσος όρος		
	Μ	Δ	Μ.Ο.	Μ	Δ	Μ.Ο.	Μ	Δ	Μ.Ο.	Μ	Δ	Μ.Ο.	Μ	Δ	Μ.Ο.
Α	121	166	144	294	299	297	218	238	228	317	302	310	238	251	245
Β	129	148	139	224	234	229	158	162	160	295	282	289	202	207	205
Γ	164	202	183	240	263	252	200	212	206	251	266	259	214	236	225
Δ	228	258	243	344	360	352	280	268	274	360	360	360	303	312	308
Ε	203	232	218	257	277	267	229	228	229	316	300	308	251	259	255
Ζ	154	173	164	247	274	261	172	181	177	299	267	283	218	224	221
Η	148	187	168	273	279	276	229	213	221	345	349	347	249	257	253
Θ	153	188	171	261	266	264	269	246	258	365	286	326	262	247	255
Ι	177	214	196	262	276	269	213	206	210	276	274	275	232	243	238
Ε.Σ.Δ.05	ns		19.4	ns		18.4	ns		28.9	ns		37.3	23.9		30.5
Μ.Ο.	164	196	180	267	281	274	219	217	218	314	298	306	241	248	245
Ε.Σ.Δ.05	15.4			ns			ns			ns			ns		

Μ = Μονές γραμμές Δ = Δίδυμες γραμμές

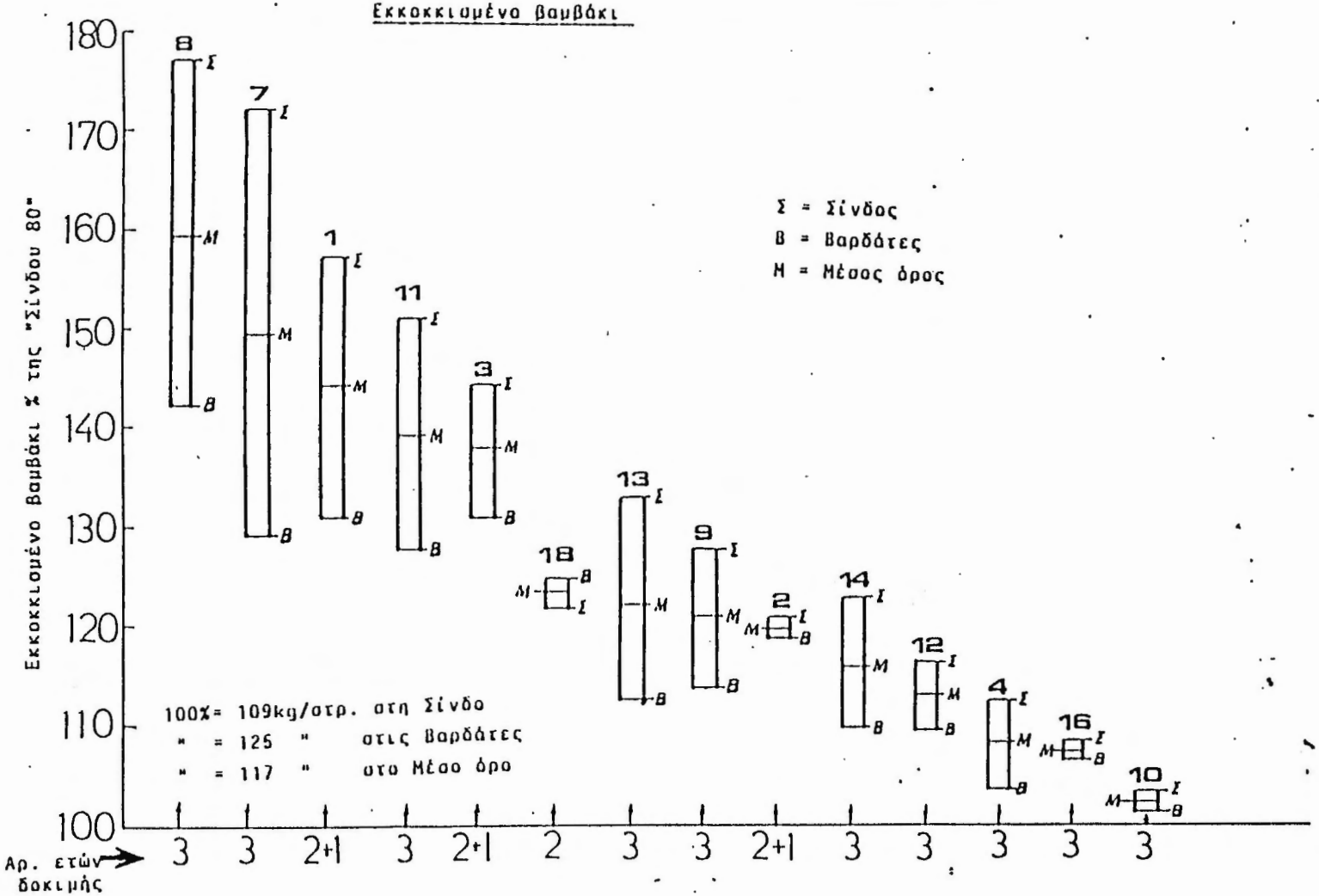
Ποικιλίες: Α = Σκοτούτσα, Β = Acala C-1, Γ = 76223, Δ = 811214, Ε = 71046,
Ζ = Θάλεια, Η = Acala SJ2, Θ = 811225, Ι = Σίνδος 80



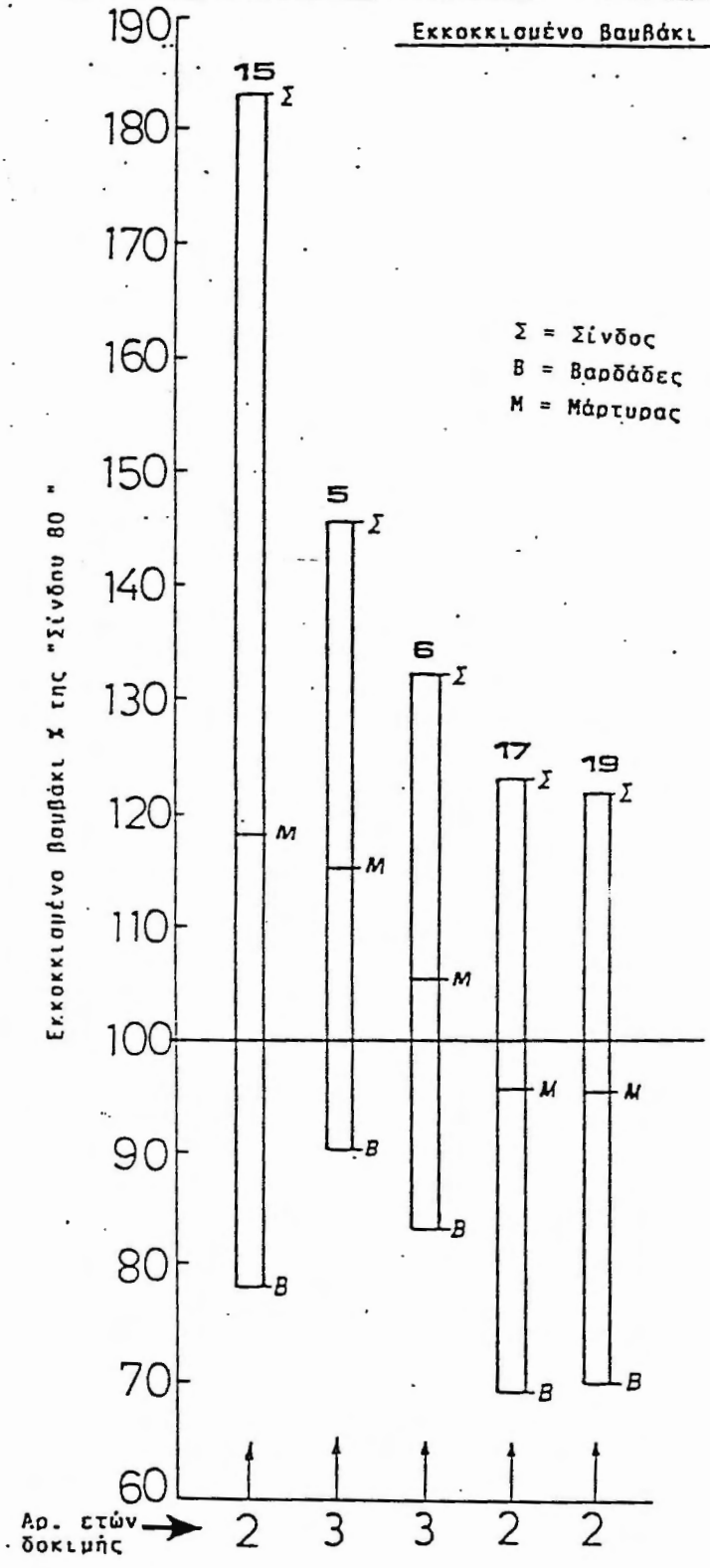
Εικ. 1. Πυκνότητα μολύσματος του Verticillium dahliae kleb. στο έδαφος, ποσοστό προσβολής και απόδοση συσπόρου μέσου όρου 9 ποικιλιών βαμβακιού σε μονές και δίδυμες γραμμές σποράς.

Fig. 1. Inoculum density of Verticillium dahliae kleb., percentage of infested plants and seedcotton average yield of 9 varieties in single and double rows.

Εικ. 1. Στέρωση ενδοειδικών F1 υβριδίων βαμβακιού % της "Σίνδου 80"



Εικ. 2. Επίδοση διειδικών F1 υβριδίων βαμβακιού % της "Σίνδου 80"



1991: 5 countries X crosses = 25 crosses. Countries: Greece (GR), Bulgaria (BU),.

F_0 GR: 1 2 3 4 5 BU: 6 7 8 9 10 ..... 21 22 23 24 25

1992

F_1 1 2 3 4 5 6 7 8 9 10 21 22 23 24 25

No Selection. Bulkseed/cross (≈ 1kg) Distribution of each cross to each country (≈ 200g/cross/country)

1993

F_2 Each cross ≈ 500 plants (≈ 10 rows X 20 m X 0,4 m distance between plants)

250 rows for all crosses

1 2 3 4 5 6 25

- Selection of the best 10% of plants (phenotypically)
- Evaluation of each plant seperately (for all characters). Bulkseed for each cross (≈ 200 g)
- Distribution of each cross to each country (50g/cross/country)
- Evaluation of average of each cross (You may keep some seeds (≈ 100g from the bulkseed of the best plants to start later pedigree selection from the best to each environment cross)

1994

F_3 Bulkseed for each cross from all locations (50g from each country X 5 countries = 200g/cross)

- Rest procedure as in F_2

1995

F_4 As in F_3

1996

F_5 Pedigree selection in each cross especially in those with best performance in each country.

ANNEXE 2.- Breeding for Earliness, Mr. Dim. Batzios, Chairman of the Working Group "Breeding for Earliness".

COTTON AND INDUSTRIAL
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GREECE

BREEDING FOR EARLINESS WG/1

Prepared for joint FAO
cotton Network/ICAC Meeting
Seville Spain 4-5 March 1991

Presented by D. Batzios
Chairman,Working Group on
Breeding for Earliness.

SINDOS FEBRUARY 1991

BREEDING FOR EARLINESS

Introduction

In most countries where cotton is grown, efforts are made to dreed the earliness of maturity. The planting of cotton varieties that will mature earlier and harvested sooner, has received conciderable attention in many countries where the growing season is restricted by temperature. Early varieties can escape quality decreasing by rain storms ,diseases and insects in the early fall. In addition economic and management factors associated with mechanized production and harvesting of cotton emphasize the need for even more earliness.

On the other hand in many parers reporded that early, rabid fruiting and maturity were associated with reductions of fiber length, length uniformity,micronaire,strength and elongation.The earliness also is associated with the resistance to verticillium. The combination of early varieties with suitable cultural techniques (sowing date,row spacing, plant population ,irrigation ,plant grwth regulators and defoliants),may be very useful to have early profitable crop. Efforts would be made to combine different characters (productivity,earliness,resistance to verticil-lium,high lint quality) in one variety. For this purpose close collaboration between scientists is necessary.

Methods of measuring earliness.

The genus Gossypium is characterized by an indeterminate flowering and fruiting habit. This fact mainly is the reason of lack of agreement among cotton breeders on the meaning of the term earliness of crop and on methods of measuring earliness in cotton.

Earliness was measured by differend indices as they are listed below:

1. Date of first flower in a plot (DFF).
2. Amount of crop harvested at a specified date (ACH).
3. Percentage of lint , seed or number of bolls harvesting at first picking (PCH).
4. Mean maturity date (MMD) as calculated from seed cotton weights (Christides and Harison) or from boll weights.

$$MMD = \frac{W1H1+W2H2+...+WnHn}{W1+W2+...+Wn}$$

where W=weight of seed cotton or no.of bolls harvested.

H=no. of days from planting to harvest or from the first picking to the others (as it is used in Greece today).

1,2,..,n = consecutive periodic harvest numbers.

5.Production rate index calculated from lint weight (PRI).

$$PRI=\frac{(W1+W2+...+Wn)^2}{W1H1+W2H2+...WnHn}$$

We consider that the MMD is an appropriate method of mesuring earliness in cotton because it is calculated from the periodic hand harvests and data from the entire crop maturity period are used, contrary to the other methods where used data from a single period.

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Results in Greece

Early material from each country was screening tested an selected in an isolated plants field for two years.Data o traits that were measured on each line and on selected plant are given in tables 1 and 2.

In tables 3,4 and 5 traits from variety trial are shown

In figures 3 and 4 diagrams of climatic values in Sindos ar given. Figures 5 and 6 gives experimental data on some of th Greek varieties .

ANNEXE 3.- Breeding for Pest and Disease Resistance, Dr. D. KYRIAKOU, Chairman of the Working Group "Breeding for Pest and Disease Resistance"

COTTON AND INDUSTRIAL
PLANTS RESEARCH INSTITUTE
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BREEDING FOR PESTS AND DISEASE RESISTANCE

By

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Agronomist M.Sci.

Prepared for the F.A.O. Cotton Network/ICAC meeting in Seville 4-5 March 1991.

February 1991

BREEDINNG FOR PESTS AND DISEASE RESISTANCE

The promblems that there are in the crop of cotton from the pests and diseases and that the science of breeding tries to confront with the resistant varieties are the following:

1 INSECTS.

At least a dozen plants characteristics have been evaluated for their effects on pests responces in cotton many of the plant-insects interractions have been corroborated by different investigators, but evidences are skecthy in some instances and completely lacking in others. Table 1 provides a summary of several plants traits and insects responses reported in literature (Maxwel and Jennings 1980). The table is incomplete and indicates that most

Table 1. Insect Resistance Characteristics in Cotton[a]

Trait	Boll Weevil	Heliothis spp.	Lygus spp.	Cotton Fleahop-per	Spider Mites	Pink Bollworm	Empoasca spp.	Thrips	Aphids	Cotton leaf Perforator	Whitefly
Frego bract	R	N	S	S	N		S	N	N		
Nectarilessness	N	R	R	R		R	R	N	N		
Glabrousness	N	R	(?)	R(?)		R	S	S	(?)		
Terpenoids (high square gossypol, heliocides)	N	R	R	R			R	S	R(?)		S
Heavy pubescence	R	S	(?)	R	N	R	R	(?)	(?)	R(?)	(?)
Red plant color	R	N	N	N					N		
Okra leaf	N										R
Oviposition-suppression factor	R										
Plant bug suppression factor			R	R							
Early-rapid fruiting	E	E				E					

[a] R = resistance; S = susceptible; E = escape; N = neutral(?) = conflicting or not verified.

of the plant resistsance research reported involved only a portion of the economical importance insects pests of cotton. From the table appears that, while a morphological characteristic as the heavy pubescencess establishes on the plants resistance on insects: Bell weevil, cotton Aleahopper, pink bollworm and Empoasa spp., the same morphological characteristic establishes on the plants susceptible to another insects. The same happens and with the physiological characteristics and with the special problems as the high gossypol character is not very useful, because the cotton seeds are currently used to produce oil.

From the above appears that whatever the progamme that has planned we have to take into serious account the danger a secontary insect to became

main. Then we have to study this problem on the production and the enviroment from the using of insecticides and after this we have to proceed in this programme.

The only morphological characteristic that is interesting is the nectarilessness, because it has only positive effects on the resistance of the plants. The nectariless trait is controlled by two pairs of recessive genes ($ne_1ne_1ne_2ne_2$) transferred to Gossypium hirsutum from Gossypium tomentosum. The double of recessive genotype lacks the extrafloral nectaries which in normal type are the lower leaf midrib and basal to the involucral bracts and the incospicuous floral nectaries are the most important in resistant on insects. Five phenotypes recognizable in segregating populations are described by Holder et al. (1968) as following:

NE1NE1NE2NE2	Full	leafs	nectaries	and	full	bracts	nectaries
Any 2 dominant allele	"	"	"		reduced	"	"
ne_1ne_1NE2ne_2	"	"	"		no	"	"
NE1$ne_1ne_2ne_2$	Reduced	"	"		no	"	"
$ne_1ne_1ne_2ne_2$	**All nectaries absent**						

The improvement of cultivation varieties of cotton can made for this trait with backcrossings,after first have been studied the varieties for this purpose continuelly these have to select for nectariless.

One project breeding of cotton for nectarilessness are as following:

First year. The members will send seeds one anothers from the varieties of their countries when they want to improve them for nectariless and then every member will select the plants having this characteristic. The design of sowing will be three rows of ten metres for one variety. The design is without replications.

Second year. The plants that have been selected from every variety have to sowed in the field to different rows and these will crossed with G. tomentosum. The father in the crossings will be the G. tomentosum, so that we will create the first BC1.

Third year. We will sow the BC1 in separate rows and after the flowering we will select the plants with nectariless and after that we will create the BC2 between the selective plants of BC1 and of respective initial varieties as fathers, that we want to improve for this characteristic.

Fourth until Eighth year. We will resume this cycle until we creating the BC7.

Nineth year. This year we will have to do self-pollination in the plants that have the characteristic nectarilessness and the last year of this programme we select the plants with nectariless and so we will have carried it in the initial varieties, that will be more resistant to the insects.

2. DISEASES.

From the diseases that are emanated in the soil and are caused by the fungis others of them cause the dumping-off of the seedling (Rhizoctonia spp., Pythium spp., Thielaviopsis basicola) and other of them cause the vascular wilt diseases (Verticillium dahliae and Fusarium oxysporum). The effects from the action of these fungis are either to damege completely the plants or to appoint inpossible the crop of a susceprible variety.

2.1 DUMPING-OFF.

The research showed that the creation resistant of varieties on dumping-off are difficult and time-spending so the problem of dumping-off is confronted with seed dressing with the fungicides. Because of the pressure of selection create resistance races of fungis, the final number of plants which survive depends from the fungicides, the fungis, the year, and the places. This is due to the fact that every fungicide usually fights a different fungus and that the effectiveness of this is different from place to place, either because of different fungis or because of different conditions of the enviroment from year to year, with effect the experimentation to be continued in order to be appreciated the fungicides of the seed dressing. This must be made in many places and to be continued at least for three years. The cotton and industrial plants Insitute in Greece is warked in this direction, where the fungicides is appreciated continuely with purpose to be found the more suitable from them, for protect of the seedlings from fungis with the best effects.

2.2 VASCULAR WILT DISEASES.

Vascular wilt diseases are caused by fungis that are usually highly destructive whether they occur in cultivated crops or in indigenous species. Losses are often such that it is no longer profitable, or sometimes it is even possible to continue to grow the crop without effective control of the disease. Indigenous plant species are often threatened because of the distructiveness of the disease.

Fungal wilts limit the production of many field crops throughout the world. Among of them with major economic interest is the crop of cotton.

The fungal wilt diseases are caused by soil bone members of the genera Fasarium oxysporum and specially Verticillium dahliae. All of them have a great potential for reducing crop yields and the second are among the most know destructive plant diseases.

The general use of resistant varieties as a means of controlling fungal wilts has be on extremely successful in some crops such as cotton. But in spite of the clear in resistance breeding, many steps of progress remains to be made. Regarding cotton crop the identification on wilt resistance and the isolation of specific resistance mechanismus are under close genetic control present complex methodical problems. One of these is the disease complexes interaction of the two plants pathogens to come a synergistic increase in disease incidence or severity Fungus wilt pathogens, especially the species of the genera Fusarium and Verticillium, are often involved in such comlexes with parasitic nematodes.

Nematodes in disease complexes may act as a wounding agent, alter the physiology or genetic resistance of the host, or serve as the vector of another pathogen in the latter instance, nematodes are primarily vectors of viruses or bacteria, although fungal spores may be carried either externally or internally by nematodes (Bergeson 1972).

The role of nematodes becomes increasingly complex in the interactions that alter the morphology and physiology of the host and thus alter susceptibility or disease development. For example, nematodes may maintain plant tissues in a perpetual juvenile state, as occurs in the roots galls caused by the rootknot nematodes with the formation of multinucleated giant cells. Faulkner et al. (1970) used Bowman's and Bloom s (1966) techique with verticillium dahliae and the lesion nematode, platylenchus minyus, on peppermint and found increased susceptibility to the wilt fungus even though the nematode was on a separate root system on the same plant. Especialy inportant is the significance of the morphological and physiological changes in the host as the result of infection by nematode and the effects of these changes on subsequent infection and disease development by wilt fungi. Especially perplexing in the question of the alteration in genetic resistance by nematode infection. Although the weight of current evidence suggests that there is no change in resistance which is complete (Monogenic), both disease incidence and severity increase in the intermediate (polygenic) resistant types and in the susceptible varieties as well.

After the above the cotton and industrial plants insitute in Greece planned a project wich aim at to study the influences from of nematodes

on the resistance of cotton varieties on Verticillium.

The first year the experiments will be located at three difference locations of Greece wherever in the soil there is the disease of Verticillium. The experimental design will be split-plot and in every experiment will be studied the resistance of varieties on Verticillium as well as the influence of the nematodes of them. In these experiments the varieties will compose the splits and the nematodes the plots, in eachone from two plots of treatments will be applied decontamination for nematodes. We will take two observations from every experimental for the resistance of varieties on the Verticillium, the first one in July and the second in September. After sampling in soil during in October will determine the number of the microslerotia per grame of soil, according to Ashworth´s method, also samples plants for determining per plant the number of nematodes as well as the poind of the infection.

Every treatment will has three rows of length 10m, the experimental row will be the middle one.

The effects of this work will show us if there is or there is not influence from nematodes for the resistance of varieties on Verticillium in Greece.

If nematodes don´t influence on resistance of varieties on Verticillium, when the programme will be continued normally for improving the resistance of the varieties on it by Backcrossings or creating new varieties resistant by crossings.

If nematodes influencingthe resistance of varieties at Verticillium, then in parallel with the improvement of varieties cotton for resistanceon Verticillium, we have to check the resistance of varieties on nematodes according to shepherd´s method (1988). Trere fore we have to work to increase the resistance of varieties to the nematodes in this way improving the varieties for resistance on nematodes, it means that we increase the resistance of these indirectly on the Verticillium.

I think that this project can be the first step for programming of the working Group for breeding at the resistane of cotton on Verticillium. Every nember will establishes three experiments with eight varieties of his own country the most resistant on Verticillium. In this programme the collaboration with phytopathologists and entomologistsis necessary and useful for determining on the one hand the number of microsclerotia per grame of soil accordind to Ashworth´s method on the other hand the degree of infection from of nematodes.

After from this cycle we can proceed the next steps of this of project.

In parallel with this programme the members will send seeds one another from varieties of their country for checking the resistance of them on Verticillium. The experimental designe will be this one balance lattice also the members will definite the number of microsclerotia per grame of soil according to Ashwortk's method, after sampling of soil that has to be taken during of the month October.

The third step that the members have to do for the iprovement of resistance of varieties on Verticillium, will be backcrossings between resistance of varieties and of the susceptible ones that we want to improve for resistsnce to Verticillium.

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T A B L E 1

Traits from lines of isolated plants field
(Sindos 1989)

a/a	VARIETY	ORIG	DOA	LYLD	% 4S	MMD	LIN	VERT
1	4s control	GR	12\7	2181	100	16.5	36	.54
2	176	BUL	12\7	2744	126	10.2	35	1.75
3	62	BUL	11\7	2468	113	6.6	32.9	2
4	442	BUL	12\7	2622	120	5.9	35.1	1.75
5	432	BUL	12\7	1957	90	6.1	35.1	1.38
6	644	BUL	12\7	2784	128	4.5	35.8	3.25
7	TASHK 3	SYR	13\7	2472	113	17.2	34.1	.25
8	TASHK 6	SYR	14\7	2306	106	16.4	36.8	1
9	ALLEPO 40	SYR	14\7	2148	98	18.4	33.3	.38
10	M 39	TUR	14\7	2062	95	18.6	38.7	0
11	M430	TUR	13\7	1768	81	21.4	42	0
12	M 503/1	TUR	14\7	1541	71	18.6	39.4	.5
13	CF 43/2	TUR	12\7	2284	105	16.4	40.4	.88
14	CFN 3/32	TUR	13\7	1802	83	17.6	39.1	.75
15	EGE 7913	TUR	13\7	1696	78	20.1	38.6	.62
16	S+ 250/2	TUR	14\7	1879	86	21.2	35.6	.5
17	ST 266/2	TUR	14\7	1806	83	18.8	36.6	.5
18	T 13	SPA	12\7	2280	105	14.9	39	.38
19	T 16	SPA	13\7	2418	111	11.1	37	1.25
20	T 100	SPA	13\7	2318	106	14.2	40	.62
21	PROMESE	SPA	13\7	2084	96	16.4	37.2	1
22	PALMA 76	SPA	13\7	1806	83	15.3	36.6	.5
23	JEREZ	SPA	13\7	2084	96	21.9	37.3	.25
24	SAMOS	GR	13\7	2163	99	10.4	36.3	.5
25	SINDOS 80	GR	13\7	2195	101	13.6	35.5	.5
26	ZETA 2	GR	13\7	2580	118	16.1	34.2	0
27	ZETA 5	GR	13\7	2370	109	16.1	37.6	0

ORIG.= Origin
DOA = Date of anthisis
LYLD = Line yield (g)
MMD = Mean maturity date
LIN = Lint per cent
VERT = Veticillium (grade 0-4)

T A B L E 2

Means of traits from selected plants of each variety
(Sindos 1989)

a/a	VARIETY	ORIG	PYLD	MMD	MBW	LIN	F50	F2.5	PRESS	MICR
1	4s control	GR	127	13.3	4.3	38.5	13.4	30.1	8.57	3.06
2	176	BUL	150	10.4	4.7	37.6	14.6	29.3	9.06	3.39
3	62	BUL	171	6.7	4.5	38.3	13.9	27.5	8.38	3.7
4	442	BUL	133	5.3	5	39.4	13.6	26.3	8.47	3.64
5	432	BUL	113	5.8	4.1	38.9	14.2	27.2	8.58	3.29
6	644	BUL	163	6.8	4.6	39.1	14	27.4	8.14	3.63
7	TASHK 3	SYR	134	18.1	4.9	35.5	13.3	27.7	8.11	3.39
8	TASHK 6	SYR	126	14.7	4.5	38.9	13.3	29.6	7.82	3.17
9	ALLEPO 40	SYR	93	28.7	4.8	38.2	12.6	28.5	8.28	3.06
10	M 39	TUR	112	20.6	4.5	40.4	12.9	28.7	7.52	3.69
11	M430	TUR	81	20.9	4.5	42.9	13.8	29.2	8.4	3.83
12	M 503/1	TUR	105	18.1	4.7	41.4	13.2	29.3	7.15	2.8
13	CF 43/2	TUR	128	16.7	5	42.2	13.5	26.8	7.79	3.77
14	CFN 3/32	TUR	111	14.9	4.1	43.5	13.5	29.5	8.16	2.74
15	EGE 7913	TUR	98	20.9	3.9	39.9	12.5	29.7	7.67	2.76
16	S+ 250/2	TUR	112	19.4	4.9	40.5	12.4	27.3	7.96	3.19
17	ST 266/2	TUR	102	18.7	5.3	39	13.2	29.3	8.19	3.53
18	T 13	SPA	105	14.5	4.2	43.8	14.2	30	8.93	4.25
19	T 16	SPA	116	11.9	4.9	40.9	13.8	28.6	8.31	3.38
20	T 100	SPA	121	17.4	5.2	44.1	13.2	28.6	8.46	3.38
21	PROMESE	SPA	103	14	4.4	41.8	13.7	28.7	9.15	3.42
22	PALMA 76	SPA	95	18.6	4.9	38.8	14.3	30.1	9.07	3.42
23	JEREZ	SPA	126	19.5	4.7	40.4	13.1	28.4	8.56	3.57
24	SAMOS	GR	138	9.1	5.2	40.2	13.7	27.4	8.88	4.06
25	SINDOS 80	GR	173	12.4	5.5	39.5	14.1	28.3	9.42	3.58
26	ZETA 2	GR	126	15.4	5.7	37.2	13.6	29.6	8.67	3.31
27	ZETA 5	GR	117	15.6	4.7	35.4	12.4	25.4	8.45	3.39

ORIG = Origin
PYLD = Plant yield
MMD = Mean maturity date
MBW = Mean boll weight
LIN = Lint per cent
F50 = Uniformity
F2.5 = 2.5% sp length
PRESS= Pressley
MICR = Micronaire

T A B L E 3

Characteristics of varieties. (Sindos 1989-90) **

VARIETY	Average yield % of 4S (kg/ha)		Earliness days	Lint %	Mean boll weight (g)	Lint technological characters		
	Seed cotton	Lint	± 4S			2.5% sp length*	Micronair index*	Pressley index*
SINDOS 80	104	109	-.5	40.1	5.5	29.6	3.13	9.64
ZETA 2	101	105	3.4	39.9	5.8	30	4.43	8.86
SAMOS	96	97	-3.6	38.8	5	29.9	4.36	9.26
4S -CONTROL	1740 (kg/ha)	665 (kg/ha)	17\9	38.2	5.5	29.3	2.93	8.91
B-176	101	96	-4.1	36.3	4.3	28.6	4.03	9.07
B-662	91	85	-5.8	35.8	4.2	28.5	3.43	8.74
B-444 (1990)	77	74	-9.4	36.7	5	-	-	-
B-442 (1989)	61	60	-4.5	37.4	3.9	26.3	3.98	8.21
B-432	91	85	-7.8	35.9	4.9	28	4.06	8.96
B-644	102	101	-7.2	37.9	5.2	27.5	3.98	8.35
TASK-3	86	87	-3.3	38.5	5.7	27.2	4.6	8.91
TASK-6	86	88	-5.1	39.3	5.5	29.8	4.06	8.84
ALLEPO-40	97	101	8	39.9	5.7	28.6	4.17	8.72
TABLADILLA-16	94	98	1.7	39.7	5.3	30.6	4.09	8.67
PROMESE	92	100	1.2	41.7	5.4	30.8	3.98	8.74
JEREZ	99	104	3.1	40.2	5.2	30.3	4.22	9.39
PALMA 76	94	99	3	40.4	5.6	30.4	3.84	8.88

* Results from one year experimentation (1989)

** The variety trial experiments have been grown unter stress irrigation contitions in both years.

TABLE 4

Physiological traits of variety trials in Greece.
(Sindos 1989-90)

VARIETY	Flowering initiation 1 bloom/m	boll opening initiation 1 op. boll/m	Plants' height blooming (cm)	maturity (cm)
SINDOS 80	11	28\8	41	72
ZETA 2	13	4\9	42	68
SAMOS	10	24\8	42	70
4S -CONTROL	11\7	29\8	43	67
B-176	9	22\8	43	56
B-662	9	23\8	44	64
B-444 (1990)	9	23\8	45	65
B-442 (1989)	9	22\8	45	65
B-432	8	20\8	45	66
B-644	11	22\8	45	72
TASK-3	12	1\9	43	72
TASK-6	12	30\8	40	60
ALLEPO-40	13	4\9	42	72
TABLADILLA-16	12	4\9	45	66
PROMESE	13	4\9	44	67
JEREZ	14	4\9	41	66
PALMA 76	12	2\9	36	71

T A B L E 5

Works' dates in variety trial experiment (Sindos 1989-90)

Works		VARIETY TRIAL 1989	VARIETY TRIAL 1990
Sowing date		24/4/89	4/5/90
Spraing for insects control		12/6/89 26/7/89	11/7/90
		10/8/89	21/8/90
Irrigations		18/7/89 1/8/89 11/8/89 25/8/89	4/7/90 24/7/90 9/8/90 11/9/90
Harvesting	a. b. c.	18/9/89 9/10/89 30/10/89	24/9/90 1/11/90

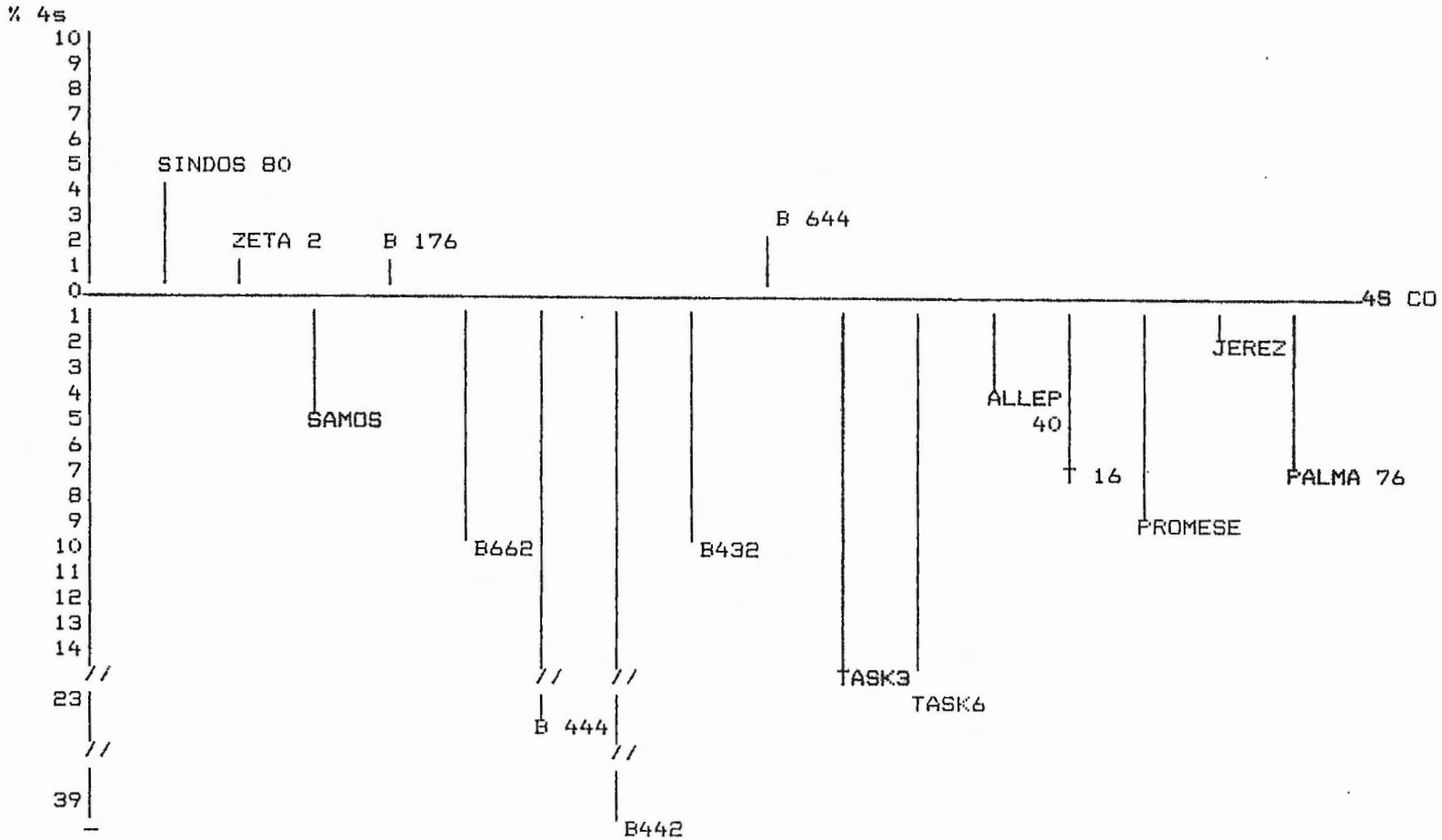

Fig. 1 Yield of varietes % ± of 4S (control)

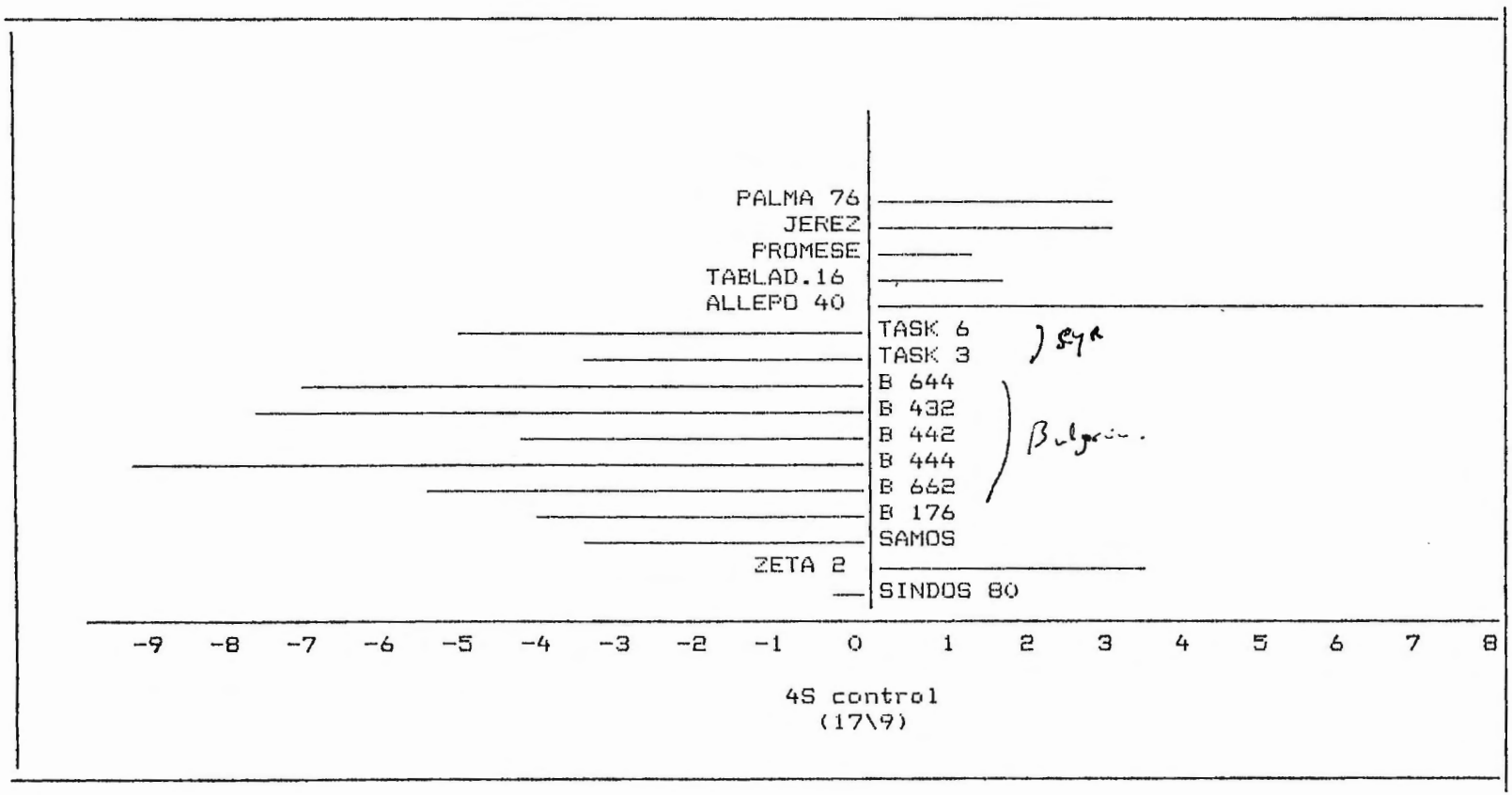

Fig 2. Earliness of varietes (days ± 4S -control)

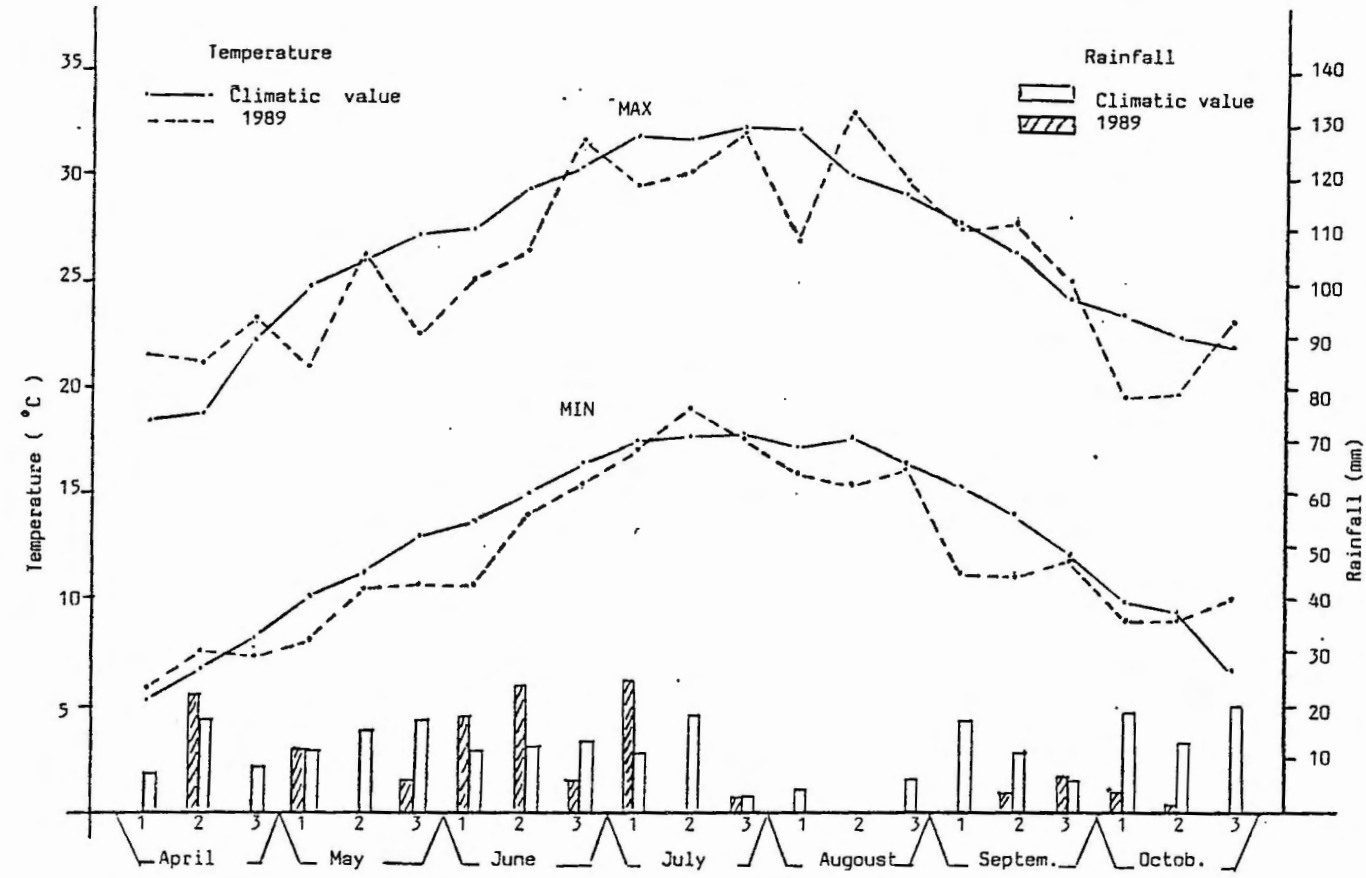

Fig.3. Temperature (max-min) and rainfall in Sindos (1989) comparing by the climatic value (mean of 30 years).

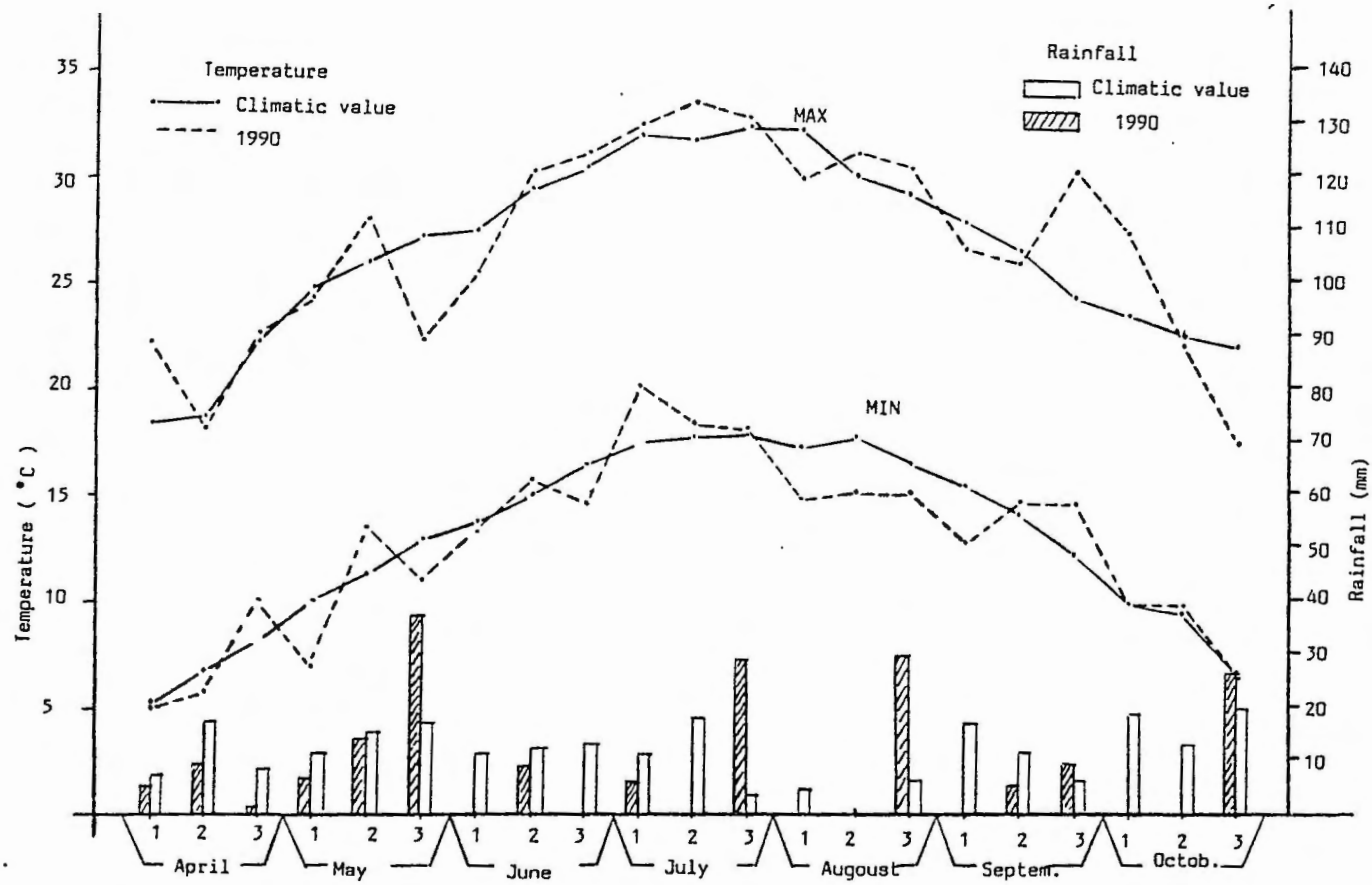

Fig.4. Temperature (max-min) and rainfall in sindos (1990) comparing by the climatic value (mean of 30 years).

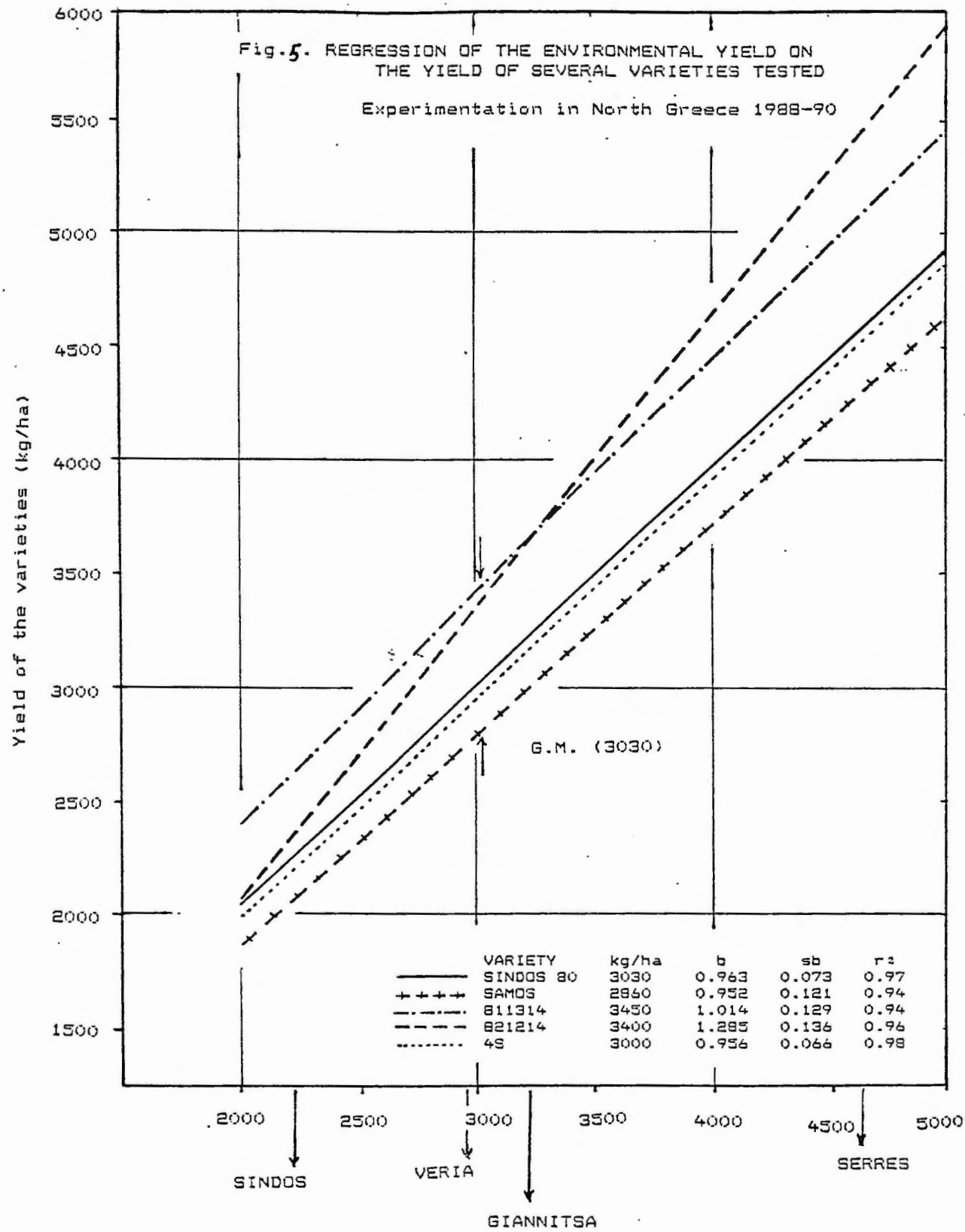
Fig.5. REGRESSION OF THE ENVIRONMENTAL YIELD ON THE YIELD OF SEVERAL VARIETIES TESTED
Experimentation in North Greece 1988-90
Yield of the varieties (kg/ha)
6000
5500
5000
4500
4000
3500
3000
2500
2000
1500
G.M. (3030)
VARIETY kg/ha b sb r²
SINDOS 80 3030 0.963 0.073 0.97
SAMOS 2860 0.952 0.121 0.94
811314 3450 1.014 0.129 0.94
821214 3400 1.285 0.136 0.96
4S 3000 0.956 0.066 0.98
2000
2500
3000
3500
4000
4500
5000
SINDOS
VERIA
GIANNITSA
SERRES
Average yield of the exreriments (kg/ha)

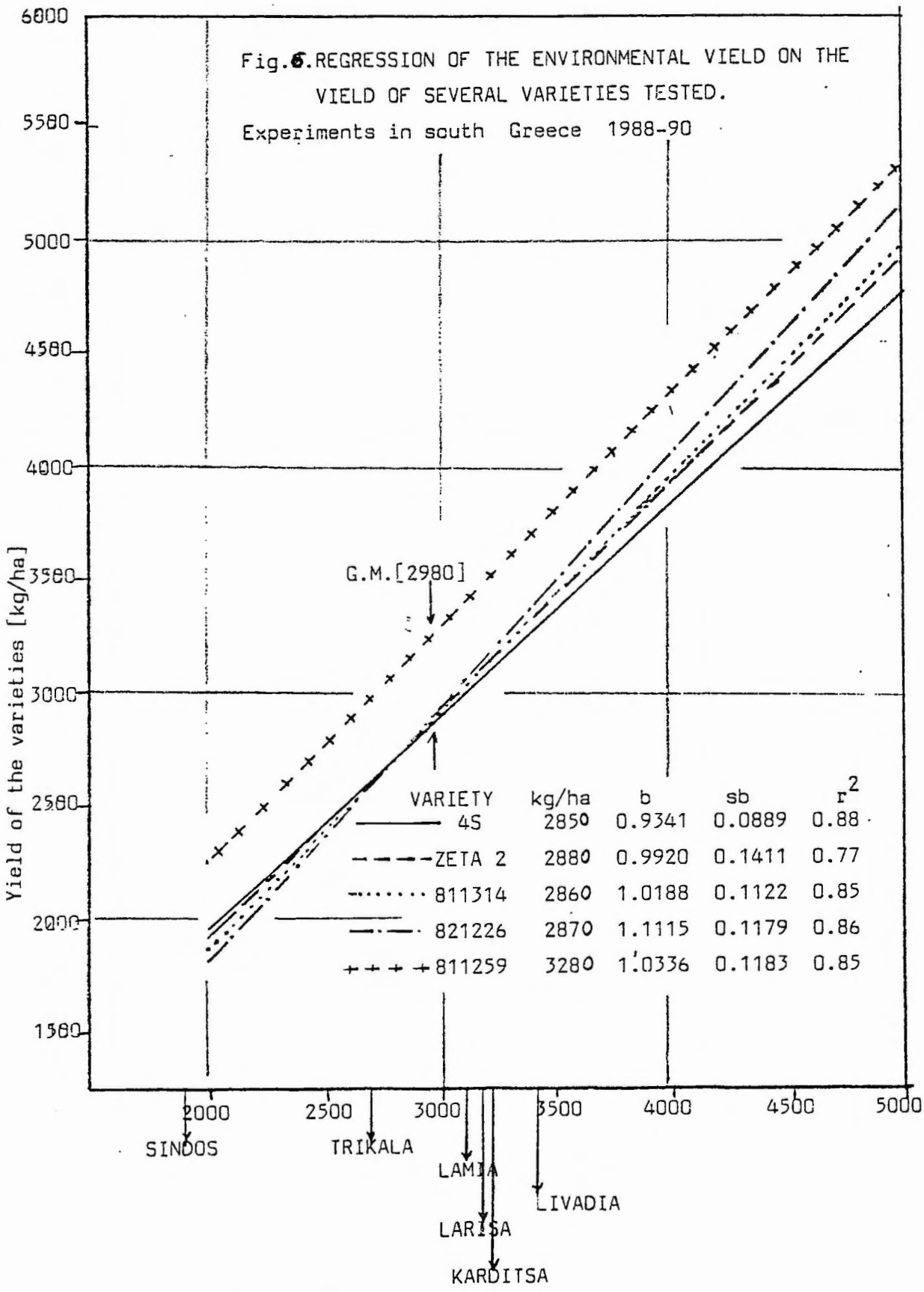
Fig.6.REGRESSION OF THE ENVIRONMENTAL VIELD ON THE VIELD OF SEVERAL VARIETIES TESTED.
Experiments in south Greece 1988-90
Yield of the varieties [kg/ha]
6000
5580
5000
4580
4000
3580
3000
2580
2000
1580
G.M.[2980]
VARIETY kg/ha b sb r2
4S 2850 0.9341 0.0889 0.88
ZETA 2 2880 0.9920 0.1411 0.77
811314 2860 1.0188 0.1122 0.85
821226 2870 1.1115 0.1179 0.86
811259 3280 1.0336 0.1183 0.85
2000
2500
3000
3500
4000
4500
5000
SINDOS
TRIKALA
LAMIA
LIVADIA
LARISA
KARDITSA
Average yield of the experiments

ANNEXE 4.- Rapport d'activité du Sous-Réseau "Cotton Pest and Disease Control", Dr. El JADD, Liaison Officer of the Sub-Network "Cotton Pest and Disease Control".

RAPPORT D'ACTIVITE DU SOUS-RESEAU LUTTE CONTRE LES RAVAGEURS ET LES MALADIES DU COTONNIER

DR EL JADD L.

Dans le cadre de la coordination du "Sous-Réseau lutte contre les ravageurs et les maladies du cotonnier", j'ai adressé le 16 Novembre 1988 une correspondance au :

- Dr J.M. MELERO-VARA, président du "Groupe de Travail Etude de Races de Xanthomonas et Verticillium".

- Dr M. ELGUINDY, président du "Groupe de Travail Lutte Integrée".

Cette correspondance avait pour objet de contacter les Coordonnateurs Nationaux des pays membres afin de collecter les informations nécéssaires pour préparer un projet de programme commun de recherches à présenter pour approbation aux pays membres.

- Dr EL GUINDY m'a fait part de ses efforts et des difficultés qu'il a, à recevoir les informations des pays membres et surtout dans des délais raisonnables.

Pour gagner du temps, il a envoyé le 30.6.1989 le programme entrepris en Egypte (copie jointe) aux pays membres. Il a proposé de réajuster ce programme type en fonction des observations qui seront faites par les coordonnateurs nationaux. Aucune réponse.

Dr. MELERO-VARA a également consulté les coordonnateurs nationaux des pays membres et il a reçu la réponse de France, Espagne, Maroc, Syrie et de Turquie. Il a resumé les informations reçues comme suit :

. Au Maroc : pas d'information sur XANTHOMONAS et VERTICILLIUM.

. En Syrie, D. KHOURY a évoqué l'importance économique de V.Dahliae sur cotonnier sur lequel différents types du pathogène ont été isolés. Quant à X.campestris, il est sans importance économique dans son pays.

. En Turquie, Dr. SAYDAM a exprimé son interêt pour particper au groupe de travail mais, il n'a pas donné d'informations sur la situation des pathogènes dans le pays.

. En Espagne, Dr. MELERO-VARA, a fait savoir que ce pays n'a pas de problèmes avec le Flétrissement bacterien. Cependant, des problèmes majeurs sont posés par Verticillium. Les variétés tolérantes sont utilisées et un programme d'eradication par solarisation du sol est en cours.

Pour ma part et dans le même objectif,j'ai envoyé le 15 Mai 1989 une lettre circulaire aux Coordonnateurs des pays membres. J'ai reçu la réponse d'Egypte, Espagne, Grèce, France (Afrique francophone), Turquie et Maroc.

L'analyse des réponses obtenues fait ressortir :

1) Le Statut des ravageurs du cotonnier (Tableau 1).

2) Les axes de recherches abordés ou souhaités en coopération (Tableau 2).

Tableau_1:Importance des ravageurs du cotonnier dans les pays ayant répondu à la note circulaire.

Ravageurs et phytopathogènes	Egypte	Espagne	Grèce *	France pour Afrique franco-phone	Maroc	Turquie
Aphis_gossypii	Majeur	Majeur	Majeur	Majeur	Majeur	Majeur
Tetranychus_urticae	-	-	Majeur	-	-	Majeur
T._cinnabarinus	Majeur	Majeur	Majeur	Majeur	Mineur	Majeur
T._telarius	Mineur	-	-	-	-	-
Frankliniella_occidentalis	-	Majeur	-	-	Mineur	-
Bémisia_tabaci	Majeur	-	-	Majeur	Majeur	-
Spodoptera_littoralis	Majeur	-	-	-	Sporadic	-
S._exigua_	Mineur	-	-	-	-	-
Pectinophora_gossypiella	Majeur	Majeur	Majeur	Majeur	Majeur	-
Earias_insulana	Mineur	-	-	-	Majeur	-
Empoasca_decipiens	Majeur	-	-	-	-	-
Nezara_viridula_	Mineur	-	-	-	-	-
Verticilium_dahliae	-	Mineur	Majeur	-	Mineur	Majeur
X._Campestris_pv._malvacearum	-	-	Majeur	-	Mineur	Majeur
Fonte des semis (Dampig off)	-	Majeur	Majeur	-	Mineur	-

* La Grèce désire travailler uniquement avec le Groupe de Travail [illegible] et Verticilium

Tableau 2: Axes de recherches entrepris ou souhaités en coopérations par les pays ayant repondu à la note circulaire..

Thèmes de recherches	Egypte		Espagne		Turquie		Maroc	
	Entrepris	Souhaités	Entrepris	Souhaités	Entrepris	Souhaités	Entrepris	Souhaités
-Utilisation de Pathogènes en lutte contre les insectes	x					x		
-Essais de pesticides contre les insectes	x			x		x	x	x
- Matériel d'application des pesticides				x			x	
-Etude de la Résistance des insectes aux insecticides	x					x		x
-Utilisation d'huiles minérales contre les insectes suceurs	x							x
-Dynamique des populations d'insectes	x						x	
-Etude du Seuil économique pour les ravageurs majeurs		x						x
-Systèmes d'avertissement agricole		x					x	
-Lutte par confusion		x		x				x
-Lutte integrée			x			x	x	x
-Modelisation		x						x
-Etude Faune auxilliaire		x	x					x
-Identification d'agents de fontes des semis et lutte			x	x	x			
-Méthodes de controle de Xanthomonas					x			
-Etude de verticilium et moyens de lutte			x	x	x			

NOUVEAUX MEMBRES DU SOUS RESEAU

Instituto Di Agronomie Générale E coltivazioni Erbacee, Universita Degli Studi Di Reggio Calabria. 89061 Gallina (ITALIE)
Correspondant : Prof. E. D'ALESSANDRO.

Bureau coton du Ministère d'Agriuclture et de la Réforme Agraire Alepeo (Syrie).
Correspondant : Dr. Farid KHOURY.

Zirai Mucadele Arastirma Enstitusu (Plant Protection Research Institute) Bornova-Izmir, 35040 (Turquie).
Correspondant : Dr. Coskun SAYDAM.

ANNEXE 5.- Egyptian Cotton Control Program, Dr. Mohsen El GINDY, Chairman of the Working group "Integrated Control".

Egyptian Cotton Control Program

Plant Phenology

1- Seedling stage
2- Vegetative stage
3- Flowering stage
4- Fruiting stage
5- Maturity (senescens)

Pest Time Occurrence

Cotton Stage	Type of Pests	Degree of Infestation
Seedling	a complex of diseases :	
	Rhizoctonia solani	minor
	Pythium ultinum	minor
	Sclerothium Rolfsii	minor
	Fusarium spp.	Egyptian cotton varieties are resistant to this fungus
	Nematodes	minor and clump
	Insects	
	Mole cricket	
	Gryllotalpa gryllotalpa	sporadic
	Cutworm	
	Agrotis ypsilon	sporadic
	Mites	
	Tetranichus telarius	sporadic
	Thrips	
	Thrips tabaci	sporadic
	Jassids	
	Psallus seriatus	sporadic
	Aphids	

Cotton Stage	Type of Pests	Degree of infestatic
Vegetative	Cotton leafworm	
	Spodoptera littoralis	major
	Aphids	
	Aphis gossypii	major
Flowering	Spodoptera littoralis	major
	Cotton bollworm	
	Pectinophora gossypiella	major
	Aphis gossypii	major
Fruiting	Pectinophora gossypiella	major
	Spodoptera littoralis	minor
	Spodoptera exigua	minor
	Erias insulana	minor
	Heliothis armigera	minor
	Aphis gossypii	moderate
	Bemisia tabaci	major
	Tetranichus telarius	minor
Maturity(senescens)	Pectinophora gossypiella	major
	Bemisia tabaci	major

Main fields of research carried out in pests and diseases

1- Disease resistance varieties.
2- Use of pathogens (bacteria ans virus) to control Spodoptera littoralis in clover fields.
3- Yearly evaluation of pesticides against cotton pests and herbicides against cotton weeds.
4- A year by year survey of resistance to insecticides in cotton field strains of Spodoptera littoralis and Pectinophora gossypiella.
5- Resistance management through rotational use of chemicals against Spodoptera littoralis and Pectiniphora gossypiella.
6- Use of light mineral oils against sucking pests.
7- Population dynamics of cotton pests.

Main fields of research for international interest

1- Establishment of economic threshols for major cotton pests.
2- Research to establish scouting procedures for pests and diseases.
3- Maximization of biocontrol agents in the environment.
4- Research on pheromones as mating disrupting agents.
5- Modeling of insect and mite populations in cotton is needed in order to be able to:
   a- Understand population status under various agroecosystems so as to anticipate problems and decide when to use pesticides or other control tactics.
   b- Understand the effect of single or multiple control tactics upon populations of pests.
   c- Use predictive population models to indicate where more research is needed to understand pest dynamics.
   d- Comprehend the effects of interactions between more than one pest or between pests and biocontrol agents in cotton.
   e- Relate cotton phenology to the status of pest populations.
   f- Costs per benefits relationships.
   G- Crop loss assessment.
   h- Forcasting in relation to weather and pest infestation.

Control methods used

1- The seedling stage

- The disease complex Rhizoctonia solani, Pythium ultinum and Sclerothium rolfsii is taken care of by good preparation of the seed bed, high quality seeds, appropriate time of plantimg and seed dressing with effective insecticides. Fusarium is controlled by resistance varieties and Egyptian varieties are genetically resistant to this fungus.
- Nematodes are controlled by crop rotation, adequate plowing and Temic only when necessary.
- Mole crickets and cutworms are controlled by adequate plowing, removal of previous crop residues and by exposing the soil to solar radiation. Only affected rows are treated with insecticidal baits. Adjacent rows are also treated as a preventive method to avoid further spreading of infeststion. Insecticidal spray of infested seedlings is not allowed to preserve natural enemies.
- Infestation with aphids first starts on cotton borders. When infestation rate reaches 20% insecticides are used only on the borders. If a portion of the population succeeds to invade cotton in the depths, this usually occurs in spots. Upon reaching 20% infestation in the spots, the spots are only sprayed and the rest of acreage is left without treatment to give the natural enemies a chance to survive and supplement the action of chemicals. As a new approach, mineral oils which are more safer than insecticides are sometimes used to suppress the population to a satisfactory level and leave natural enemies intact.
- Infestation with aphids usually dominates jassids and thrips and chemical control directed to combat aphids is also effective against either pest.
- As for mites, Kelthane or Kelthane S can do a perfect job and are sprayed in only the infested spots.

2- The vegetative stage

The egg-masses of Spodoptera are layed on the lower surface of the leaves thus escape insecticidal treatment. The egg-masses are hand picked then burned. If some egg-masses are left behind, hatched larvae of 1st and 2nd instars are sprayed with chlorpyriphos or methomyl

3- Flowering stage

- Continuation of Spodoptera control in the manner previously described.
- Infestation with Pectinophora gossypiella starts on flowers during the first half of June. Research has validated that 10% flowering coincides with high infestation rate. When this percentage is reached spray with chemicals begins to protect the bolls that will form later. This shows the importance of relating plant phenology with pest incidence.

4- Fruiting stage

- In this stage the most common pests are Pectinophora, Spodoptera, Aphis and Bemisia. Three insecticide applications are used to control this pest complex. Insecticides of different groups are used in rotation presumably sufficient to check all insects anticipated to infest the crop at this stage of its development. The rotation program is distinguished by the fact that each insecticide is used only once by rotation.
- In general the pest complex of both the fruiting stage and the flowering stage is taken care of by an OP-IGR mixture in the first spray, followed by a pyrethroid in the second, an OP in the third, and a carbamate in the fourth.
- The position of each insecticide in the sequence is carefully directed to control each insect in the pest complex, provided that the overall effect is the satisfactory reduction of all pests till the end of the maturity stage.
- The use of pesticides of differing classes or modes of action in rotation has been much studied by Egyptian entomologists and accepted to avoid resistance. Therefore insecticide rotations can reduce resistance allele frequencies, assuming that resistant genotypes have substantially lower fitness than the susceptibles. Hence their frequency declines during generations between applications of the compounds.

5- Maturity stage

- Localized spraying may be undertaken against Aphis gossypii , bemisia tabaci and Tetranichus telarius at the end of the cotton season.

6- Post-harvest

- After harvest cotton stalks with the remaining bolls usually harbor a high population of Pectiniphora gossypiella, so the stalks are either destroyed by burning or by burrying in soil by deep plowing.
- The seeds are also followed to the ginneries and sanitated by heating at 60°C to get rid of diapausing larvae.

Chemical products used

Pest	Chemical	Rate of application
Disease complex	Monserine 25%	seed dressing(3g/Kg)
	Rizolex T 20 30%	seed dressing(3g/Kg)
	Kinolyte 15 50%	seed dressing(3.5g/Kg
	Vitafax 35 35%	seed dressing(3g/Kg)
	Pastiac 80%	seed dressing(4g/Kg)
Nematodes	Temic 10%	soil application (10Kg/feddan)
	Vidate 10%	soil application (10Kg/feddan)
Aphids and thrips	Nuvacron 40%	400cc/400L
	Tamaron 60%	500cc/400L
	Cyanox 50%	500cc/400L
	Deltanate 40%	400cc/400L
	Folimat 80%	500cc/400L
Mites	Tedifol 18.5 6%	1L/120L
	Kelthane 18.5%	1L/200L
Cutworm and mole cricket	Nuvacron 40%	1L/200L baits
	Hostathion 40%	1.25L/200L baits
	Cyanox 50%	1.25L/200L baits

Pest	Chemical	Rate of application
Jassids	Tamaron 60%	1.25L/200L
	Kelthane S 18.5 8%	1.25L/200L
Cotton leafworm	Mirlane 51%	1L/400L
	Tamaron combi*30 30%	2L/400L
	Denate**27 4%	1L/400L
	Curacron 72%	0.75-1L/400L
Bollworms	Empire* 48 3%	1L/400L
	Larvin 80%	500g/400L
	Tamaron Combi*30 30%	2L/400L
	Catabron*47.3 26.7%	750cc/400L
	Baythroid 5%	750cc/400L
	Decis 2.5%	750cc/400L
	Sumicidin 20%	600cc/400L
	Meothrin 20%	750cc/400L
	Ripcord 30%	200cc/400L
	Fastac 25%	100cc/400L
	Kerat 2.5%	750cc/400L
	Sumialpha 5%	600cc/400L

* OP IGR ** Carbamate IGR

Biological control

Survey and biology of entomophagous beneficial insects are well defined in Egypt. We have a unit for Bacillus and virus research. Attempts are being made to explore formulations that can withstand solar radiation. Bacillus thuriengenesis is used to control Spodoptera littoralis in clover during the fall. Pheromones are used in field trials as sex attractants and as mating disturbance agents. However research in these areas has not yet validated their incorporation with insecticides in IPM programs. We beleive that these channels deserve joint exploitation between participant countries.

On going research for the development of IPM programs in cotton as well as in many other crops is now intensified through collaborative research with international organizations and insecticide producers.

ANNEXE 6. - Report - Variety trials working group. FAO. COTTON NETWORK, Dr. A. BORRERO, Variety Trials Working Group Chairman - Departamento Algodon, CIDA, Las Torres, Alcala del Rio (Seville), Spain

REPORT - VARIETY TRIALS WORKING GROUP. FAO. COTTON NETWORK.

Seville, 4 March 1991

A summary was made of the activities during the years 1989-90, continuing with the discussion about planning for the future. The letter of 30 th November 1988, sent to the Coodinators, copy enclosed, as well as the comments about it from Greece, Morocco, Italy, Bulgary and Ivory Coast were used as a base.

As a result of everything we get the following conclusions.
Common Project : A variety trial for all the participant countries with common varieties.

Objective : To analyse the results and to try to determine the reasons of them, better then a description of the different varieties. To evaluate the influence of the different factores,mainly the climatological data (temperature, relative humidity...

Method : The trials will be established in randomized blocks including two varieties of each country wishing to bring them.

Each participant must be compromised to establish this experiment during 3 years using the same varieties and to send the results to Seville.

According to the initial letter the following points were decided :

Design : Randomized blocks with 6 replications. Two rows, 10 m length. Usual spacement with typical density of population used in the country.

Varieties : Two varieties for a country. We hope collaboration of Greece, Bulgary, Syria, IRCT, Spain and perhaps some other countries. That means 10-12 varieties.

Cycle of Varieties : The varieties must be representative of the cotton growed in each country, with different cycles.

Management of the experiment : Careful management according to the best uses of the farmers. No application of growth regulator and defoliants.

Two crops.

Data to take by variety and replication.

Date to planting.
Date of emergency.
Date of blooming. When there was one flower per each meter of row.
Date of boll opening. When there was one open boll per each meter of row.
Height of each variety at maturity.
Report of experiment planning, culture operations, labour, cultivations, incidence and treatment of pest and diseases, date of irrigations, water amount if is possible, etc.
Weight of seed cotton.

Other informations :

Soil analysis. Climate data (temperature, rain, relative humidity, etc.)

Laboratory analysis.

To take samples of each picking in each of four replications.

To make determination of percentage of fiber in gin and quality of fiber (grade, length, fineness, maturity, strenght (Stelometer, Pressley, HVI), colorimeter). All these determinations to be made by the own equipment.

Amount of seed. 0,5 Kg of each variety for each supplier country to send to each other participant.

Suppliers of seed. Bulgary, Greece, IRCT (Montpellier), Syria (must confirm its possibilities), Spain and other countries wishing to send it.

Participants. Bulgary, Egypt, Greece, IRCT (four african countries),Italy (three universities), Morocco, Syria (to confirm) and Spain. New participants will be welcom

Work to 1991. the date of planting is very proximate. However, to try to profit this season. So we invite the supplier with possibilities to send seed of his two varieties to the participants.

Work for the future. In any case we must make a cycle of three years. This would be 1992-1994, if the present year was not successful.

NOTE : It is asked to the Institutions that have made variety trials during 1989 and 1990, to send their results to Seville (Dr. Borrero).

ANNEXE 7.- Organization Chart of the "Cooperation Network for Cotton Research.

RK COORDINATOR	COORDINATION CENTRE	SUB-NETWORK	LIAISON OFFICER	WORKING GROUP	CHAIRMAN
				1.Breeding for Earliness	Mr. Dim. Batzios Cotton and Industrial Plants Institute 57400 Sindos,Thessaloniki,Greece
		I. Cotton Breeding	Dr. S. Galanopoulou Cotton and Industrial Plants Institute 57400 Sindos, Thessaloniki, Greece Tél : 19 30 31 79 94 44 19 30 31 42 36 02 (domicile) Fax : 19 30 31 79 76 74	2.Breeding for Pest and Disease Resistance	Dr. D. Kyriakou Cotton and Industrial Plants Institute 57400 Sindos,Thessaloniki,Greece
				3.Variety Trials	Dr. A. Borrero Departamento Algodon C.I.D.A. Las Torres Apartado Oficial 41200 Alcala del Rion (Seville), Spain Tél : 19 34 54 78 01 12 Fax : 19 34 5 56 50 37
				1.Irrigation	Dr. J. Berengena Departemento de suelo y agua C.I.D.A. Cordoba Apartado 240 14071 Cordoba,Spain
		II.Agronomy and Physiology of Cotton	Dr. E. Fereres Departamento de suelo y agua C.I.D.A. Cordoba Apartado 240 14071 Cordoba, Spain Secrét. : Lucia CHACON	2.Integrated Weed Control	Mr. Michel Deat Insitut de recherche du Coton et des Textiles Exotiques, B.P. 5035 34032 - Montpellier Cedex, France
				3.Nitrogen Fertilization	Miss H. Setatou Cotton and Industrial Plants Institute 57400 Sindos, Thessaloniki, Greece Dr. A. Simonis Ministry of Agriculture Soil and Ferilizer Research Institute GR 54110 Thessaloniki, Greece
Michel BRAUD	Insitut de Recherche du Coton et des Textiles Exotiques 6, rue du Général Clergerie 75116 - Paris, France Telex : 610 992 IRFAGRU Fax : (1) 47 55 46 21		Tél : 19 34 957 29 47 33 19 34 957 29 33 33 19 34 957 29 35 33 Fax : 19 34 957 20 27 21 19 34 957 29 71 54	4.Growth Regulators	Dr. K. Kosmidou-Dimitropoulou (Mrs) Hellenic Cotton Board 150 Syngrou Ave Athens, Greece
				5.Micronutrients and Foliar Ferilizers	Prof. D.M.M. El-Fouly National Research Centre Sh. El-Tahrir Cairo-Dokki, Egypt Telex : 94022 MAREC, UN
		III.Cotton Pest and Disease Control	Dr. L. El Jadd Director Station de recherches Cotonnières - INRA Beni-Mellal, Morocco TLX : INRA 210 32 M	1.Integrated Control	Dr. Mohsen Elgindy Central Agricultural Pesticides Laboratory ARC/MOA Cairo University Street Giza, Egypt Telex : 20332 FCRI UN
				2.Studies on Races of Xanthomonas and Verticillium	Dr. José Melero Departamento de proteccion vegetales CIDA,Cordoba Apartado 240 14071 Cordoba, Spain
		IV.Technology	Dr. Aly Elashwat Cotton Research Institute Cairo University Street Giza, Egypt Tél. 19 20 2 72 71 15 tlx: 20332 FCRI UN Fax: 19 20 2 70 55 63	1.Standardization of Quality Parameters	Ing.J. Louwagie Ghent State University Laboratory De Meulemeester Grotesteenweg-Noord 2 9052 ZWIJNAARDE - Gent - BELGIUM
				2. Effects of Environment and Inputs on Fiber Quality	Dr. M. Kechagia - Michailidou (Ms) Cotton and Industr. Plants Instit. 54700 SINDOS, Thessaloniki, Greece

ANNEXE 8.- List of the National Coordinators.

* * * * *

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